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LRTAP INTERCOMPARISON STUDY L 6: MAJOR IONS, NUTRIENTS AND PHYSICAL PROPERTIES IN WATER

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SEPTEMBER 1984

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by

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September 1984

NWRI CONTRIBUTION NO. 85-41

LRTAP Intercomparison Study L-6 Major Ions, Nutrients and Physical Properties in Water

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EXECUTIVE SUMMARY

The Canadian LRTAP program (long range transport of atmospheric pollutants) involves many different laboratories who individually produce data for regional or national objectives. If these data are to be merged or if they are to be used to establish long-term trends it is imperative that the data be verified as comparable between laboratories and that laboratories have produced data in a controlled and unbiased manner. This report describes a sixth interlaboratory study that addresses these issues.

This study consisted of 10 water samples and was distributed to 46 laboratories who were requested to analyze for 14 different constituents. Data provided was analyzed for bias by the rank order method of Youden. Results which deviated significantly from interlaboratory sample medians were flagged.

This report is a compilation of all results received and evaluated. The individual laboratory appraisals provided to participants in August 1984 are included. The evidence on study to study performance provided in this report indicate several laboratories are improving.

ABSTRACT

This report is a compilation of results received and evaluated for LRTAP interlaboratory study L-6. The report includes all laboratory specific appraisals that had been provided earlier (August 1984) to laboratory heads and project managers. The study consisted of 10 samples of which six were natural waters derived from LRTAP watershed programs or precipitation networks. Four samples were distilled water synthetic references. Laboratory data sets were appraised for bias by the rank order method of Youden. Individual sample results were flagged if deviating significantly from interlaboratory median values. The parameters included Ca, Mg, Na, K, Cl, SO_4, acidity, total alkalinity, gran alkalinity, pH, specific conductance, colour, reactive silica and nitrate plus nitrite. Included in this report is a brief comparison of bias and flag frequency for each participant in studies L-1, L-3, L-4, L-5 and L-6. A brief statement on laboratory performance as being either satisfactory, moderate or poor is given for 49 different LRTAP laboratories.

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INTRODUCTION

The long range transport of atmospheric pollutants (LRTAP) program involves many different laboratories that contribute data for various project objectives. If the data are to be merged or used for year to year trend or impact studies, then it is necessary that laboratories be defined as in control and comparable. This interlaboratory study addresses these issues. The merits and impact of interlaboratory studies are described elsewhere (1,2,3). Five recent interlaboratory studies provided for the LRTAP program are listed at the end of this report.

Background of Study

This study was organized during the fall and winter of 1983-84. It was distributed to client laboratories in April 1984 and had a June, 1984 deadline assigned. Not all participants reported on schedule. The appraisals in this report were provided to each participant in August 1984 and reflect laboratory performance during that time frame: April 1984 to July 1984. All laboratories who exhibited bias or eratic results have hopefully taken internal action to review and correct their measurement process.

Release of Laboratory Codes

Laboratories that participated in this study are identified by their affiliations at the end of this report. The individual

results in Appendix I and the appraisals compiled in Appendix II have laboratories coded by number. The key to these codes, although confidential, is available on a need to know basis. Users of data and program managers are encouraged to seek out the source of their data and openly discuss issues of quality with their client laboratories.

Design of the Study

The study comprized of 10 different water samples distributed to 44 laboratories. The samples are described in Table 1. Several were recycled from an earlier study. Their inclusion has merit as they assist in verifying stability and allow individual laboratories who exhibited poor results to update and verify performance.

Table 1: Description of Samples

Sample Number	Source of Water	Previous Use (Study/Sample Number)
1	Bulk Ontario Precipitation	L-5/#6
2	CCIW Precipitation - Summer 1982	L-4/#8
3	Synthetic	L-4/#7
4	Composite Rain (OME)	
5	ELA Watershed (Lake No. 239)	L-1/#6
6	Turkey Lakes Watershed	L-1/#7
7	Montmorency Watershed (Lac Tentare)	L-1/#4
8	Synthetic	L-5/#9
9	Synthetic	L-3/#9
10	Synthetic	L-5/#10

Preparation of Samples

Test sample bottles for this study were 500 mL linear polyethylene. These were either new bottles or bottles recycled from earlier studies. All bottles were washed with chromerge, tap water rinsed and then thoroughly rinsed with distilled water. They were then filled with distilled deionized water and stored 1 week to 50 weeks before use.

Forty litre aliquots of stock samples (see Table 1) were obtained by syphoning from stock waters (100 to 200 litres) maintained in permanent storage at 4°C. The 40 litre substocks were mixed vigorously and 400 mL units serially transferred to the clean bottles. Samples so prepared were all stored at 4°C until distributed to the participants.

Evaluation of Data

Interlaboratory data sets were evaluated for bias by the nonparametric rank order method of Youden (4,7) which had been modified by Clark (2,5) to allow for computerized evaluation. A set of data is said to be biased when it exhibits a tendency to be higher or lower than some standard. The standard for these studies is the performance of all participating laboratories. For these studies there is about a 1 chance in 20 of deeming a laboratory set biased when it is not.

In addition to bias, results on each individual sample were evaluated by flagging results that deviated significantly from the interlaboratory medians. This process is described elsewhere (study L-1, L-2, and References 2 and 5). The criteria for flagging is given in Table 2.

To assist in evaluating data, analysts were requested to report all their calculated results and to use the codes W and T where appropriate. This format is described in study L-1 and L-2 and found in a recent ASTM Standard Practice (6).

RESULTS AND DISCUSSION

General

Laboratory results, brief method statements, bias and assigned flags are provided in Appendix I. Laboratories that were assigned bias are in most situations in error due to calibration. Flags assigned on individual samples reflect, in most cases, a lack of precision in the method applications. Those laboratories assigned a high frequency of bias (based on whole data sets) as well as a high percentage of results flagged have hopefully taken appropriate internal corrective action (8). The appraisals had been provided shortly after the completion of the study. A compilation of all appraisals is given in Appendix II.

Flags and Bias

The procedures used for flagging an individual result and for discerning a set of data as biased is described elsewhere (2, 4, 5, 7) A brief description is also given in Appendix III. The criteria to flag a result is given in Table 2. A summary of flag and bias statements is given in Table 3. This table was prepared from the detailed evaluations found in Appendix I. Those laboratories underlined in Table 3 were informed when appraisals were mailed that some review was perhaps necessary and that corrective action was in order.

Comparison of Results to Earlier Studies

A summary of median values between laboratories is given in Table 4. These values are abstracted from Appendix I. Several of these samples were recycled from earlier studies. A comparison of study to study interlaboratory median values is given in Table 5. Overall the agreement between studies is very good, and this helps verify the stability of test samples. However, several interesting differences between studies were noted. The medians for acidity are overall not always very close. This is attributed to the small data sets, the low concentration and the differences between laboratory methods. The large difference for nitrate plus nitrite in the CCIW precipitation (refer to Table 5) appears related to ammonia nitrate

TABLE 2: Summary of criteria used for flagging results*

Constituent	LLBAE					BAE					CEI				
	L-1	L-3	L-4	L-5	L-6	L-1	L-3	L-4	L-5	L-6	L-1	L-3	L-4	L-5	L-6
Ca	5	2.5	2.5	2.5	2.5	0.25	0.188	0.15	0.15	0.15	0.10	0.096	0.08	0.08	0.08
Mg	1.0	1.0	1.0	1.0	1.0	0.15	0.046	0.05	0.05	0.05	0.10	0.099	0.10	0.10	0.10
Na	3	0.5	0.50	0.50	0.50	0.4	0.2	0.20	0.20	0.20	0.10	0.15	0.14	0.14	0.14
K	0.5	0.50	0.20	0.20	0.20	0.15	0.13	0.05	0.05	0.05	0.10	0.108	0.16	0.16	0.16
Cl-IC	-	-	1.5	1.5	1.5	-	-	0.25	0.25	0.25	-	-	0.15	0.15	0.15
Cl-non IC	-	-	1.5	1.5	1.5	-	-	0.25	0.25	0.25	-	-	0.15	0.15	0.15
Cl (Total)	5	1.5	1.5	1.5	1.5	0.50	0.26	0.25	0.25	0.25	0.05	0.178	0.15	0.15	0.15
SO_4-IC	-	-	2.0	2.0	2.0	-	-	0.76	0.76	0.76	-	-	0.20	0.20	0.20
SO_4-non IC	-	-	2.0	2.0	2.0	-	-	0.76	0.76	0.76	-	-	0.20	0.20	0.20
SO_4 (Total)	5	6.0	2.0	2.0	2.0	0.5	0.746	0.76	0.76	0.76	0.10	0.168	0.20	0.20	0.20
Acidity	1.0	1.0	1.0	1.0	1.0	1.0	0.75	0.75	0.75	0.75	0.10	0.50	0.50	0.50	0.50
Total Alka	10	2.5	2.5	2.5	2.5	1.25	1.19	1.20	1.20	1.20	0.10	0.086	0.08	0.08	0.08
Gran. Alka	-	-	0.05	0.05	0.05	-	-	0.50	0.50	0.50	-	-	0.10	0.10	0.10
pH	7	0	0	0	0	0.25	0.25	0.25	0.25	0.25	0	0	0	0	0
Spec. Cond	50	50	50	50	50.0	2.5	2.82	2.8	2.8	2.8	0.05	0.078	0.08	0.08	0.08
Colour	5	5	5	5	5.0	5	2.03	2.2	2.6	3.0	0.10	0.182	0.18	0.20	0.20
Si	0.2	0.10	0.1	0.10	0.10	0.05	0.05	0.05	0.05	0.05	0.10	0.067	0.08	0.08	0.08
NO_3+NO_2	0.2	0.05	0.5	0.50	0.50	0.05	0.024	0.025	0.25	0.25	0.10	0.142	0.20	0.20	0.20
Ba	-		0.01	-	-	-		0.005	-	-	-		0.10	-	-
DOC	1.0	5.0	3.0	-	-	1.0	2.03	1.5	-	-	0.10	0.182	0.20	-	-

* Criteria cited for study L-3 above, differs slightly from that used when the initial appraisals were prepared in August 1983 and mailed to participants. The parameters involved are pH, silica, acidity and Na.

LLBAE = lower limit for use of basic acceptable error.
BAE = basic acceptable error.
CEI = concentration error increment.

Table 3. Summary of Flags and Bias Statements

Lab Code	Number of Parameters Reported	Bias		Flags		
		Number of Bias Statements	Percentage of Parameters Biased	Number of Results Ranked	Number of Flags Assigned	Percentage of Results Flagged
L002	12	0	0%	112	9	8.0%
L003	14	2	14.3	124	19	15.3
L004	12	3	25.0	115	26	22.6
L005	6	0	0	46	11	25.0
L006	13	6	46.1	129	39	30.0
L007	9	1	11.1	90	1	1.1
L009	10	1	10.0	98	4	4.1
L010	13	6	46.2	127	36	28.3
L011	13	0	0	136	6	4.4
L013	9	0	0	90	2	2.2
L014	11	0	0	108	20	18.5
L016	9	4	44.4	90	11	12.2
L019	10	0	0	100	5	5.0
L020	13	30	15.4	122	7	5.7
L021	11	4	36.4	97	24	24.7
L022	13	5	38.5	128	31	24.2
L023	13	1	7.7	121	12	9.9
L024	13	0	0	129	6	4.7
L025	9	1	11.1	88	10	11.4
L027	13	1	7.6	129	3	2.3
L028	2	2	100.0	19	11	57.9
L029	12	1	8.3	118	6	5.1
L030	7	1	14.2	78	0	0.0
K031	12	1	8.3	115	7	6.1
L032	14	1	7.1	140	21	15.0
L033	12	0	0	92	23	25.0
L045	12	5	41.7	116	8	6.9
L046	12	4	33.3	115	17	14.8
L048	12	1	8.3	118	15	12.7
L049	13	5	38.5	120	18	15.0
L050	4	2	50.0	38	4	10.5
L057	11	1	9.1	102	14	13.7
L058	11	0	0	106	12	11.3
L060	9	3	33.0	88	17	19.3
L061	11	0	0	33	0	0.0
L062	15	3	20.0	148	8	54.0
L063	15	3	20.0	147	13	8.8
L064	11	2	18.2	105	16	15.2
L066	10	3	30.0	97	2	2.1

Table 4. Summary of Interlaboratory Median Values

Parameter	Sample Number / Median Values on Samples 1 to 10									
	1	2	3	4	5	6	7	8	9	10
Calcium mg Ca/L	1.5	2.42	0.310	8.0	4.02	5.60	1.311	3.10	26.5	42.6
Magnesium mg Mg/L	0.34	0.73	0.06	1.60	1.00	0.518	0.290	2.70	7.70	9.40
Sodium mg Na/L	0.31	0.060	0.510	1.92	1.29	0.60	0.530	1.24	4.05	19.0
Potassium mg K/L	0.144	0.09	0.33	0.61	0.845	0.23	0.28	0.50	2.40	0.890
Chloride mg Cl/L I.C.	0.943	0.803	1.54	1.99	0.520	0.270	0.25	1.29	6.80	106.0
Chloride mg Cl/L non I.C.	0.900	0.795	1.50	2.09	0.600	0.300	0.20	1.22	6.90	105.0
Chloride mg/Cl combined	0.90	0.80	1.56	2.0	0.55	0.30	0.25	1.3	1.8	105.0
Sulfate mg SO_4/L I.C	5.4	5.37	0.350	9.04	5.21	6.38	5.06	3.26	19.26	37.4
Sulfate mg SO_4/L non I.C.	5.24	5.20	0.40	9.04	5.43	6.50	5.01	3.29	19.4	36.5
Sulfate mg SO_4/L combined	5.325	5.29	0.37	9.2	5.3	6.5	5.04	3.32	19.3	37.1
Acidity mg $CaCo_3$/L	3.90	3.01	1.50	1.54	1.92	1.52	3.00	1.47	1.74	1.50
Total Alkalinity mg $CaCo_3$/L	0.0	0.95	1.54	17.85	10.4	9.95	1.4	40.5	82.0	1.54
Gran Alkalinity mg $CaCo_3$/L	-2.05	-0.70	0.160	17.09	9.86	9.16	-0.105	40.6	81.4	0.015
pH	4.40	4.79	5.64	7.20	7.07	7.05	5.22	7.73	8.0	5.6
Specific Conductivity umho/cm	36.8	32.5	8.0	67.0	38.6	39.4	18.4	93.05	224.0	444.0
Colour (Hazen Units)	5.0	2.25	5.0	30.0	15.0	9.5	6.7	3.65	2.0	4 5.0
Reactive Silica mg Si/L	0.09	0.20	0.049	1.4	2.4	1.2	1.76	1.12	0.57	0.007
Nitrate + Nitrite mg N/L	0.77	1.16	0.009	0.25	0.080	0.208	0.110	0.300	0.440	0.030

Table 5. Comparison of Interlaboratory Median Values (between Studies)

Parameters	Ontario Precipitation		CCIW Precipitation		Synthetic		ELA No. 239		Turkey Lakes Water Shed		Montmorency Water Shed		Synthetic		Synthetic		Synthetic	
	L6-1	L5-6	L6-2	L4-8	L6-3	L4-7	L6-5	L1-6	L6-6	L1-7	L6-7	L1-4	L6-8	L5-9	L6-9	L3-9	L6-10	L5-10
Calcium	1.5	1.5	2.40	2.13	0.31	0.30	4.02	4.0	5.6	5.8	1.3	1.3	13.1	13.0	26.6	26.8	42.6	42.2
Magnesium	0.34	0.33	0.73	0.61	0.066	0.07	1.0	1.0	0.52	0.53	0.29	0.3	2.70	2.70	7.7	7.74	9.4	9.3
Sodium	0.31	0.30	0.06	0.066	0.51	0.519	1.29	1.27	0.60	0.65	0.53	0.6	1.24	1.30	4.05	4.10	19.0	19.2
Potassium	0.144	0.15	0.09	0.088	0.33	0.325	0.85	0.85	0.23	0.21	0.28	0.26	0.50	0.50	2.40	2.40	0.890	0.90
Chloride (IC)	0.94	0.91	0.803	0.80	1.55	1.50	0.52	0.54	0.27	0.30	0.25	0.32	1.30	1.39	6.80	6.90	106.0	106.0
Chloride (Non IC)	0.90	0.90	0.795	0.74	1.50	1.45	0.60	-	0.30	-	0.21	-	1.30	1.22	6.90	-	105.0	104.0
Sulfate (Non IC)	5.4	5.4	5.3	5.2	0.350	0.500	5.2	5.2	6.38	6.2	5.1	5.0	3.40	3.26	19.2	19.3	37.4	37.9
Sulfate (IC)	5.2	5.4	5.2	5.21	0.40	0.330	5.4	-	6.50	-	5.01	-	3.20	3.29	19.4	-	36.5	36.5
Acidity	3.9	4.5	3.01	1.65	1.50	1.61	1.92	-	1.52	-	3.0	-	1.60	1.47	1.74	2.00	1.50	1.8
Total Alkalinity	0.0	0.75	0.95	2.1	1.54	1.50	10.4	10.5	9.9	11.0	1.4	2.0	41.0	40.5	82.0	81.2	1.54	1.45
Gran Alkalinity	-2.05	-1.9	-0.70	1.68	0.160	0.100	9.8	-	9.2	-	0.1	-	40.7	40.6	81.4	-	0.015	-0.02
pH	4.4	4.4	4.5	6.0	5.64	5.60	7.1	6.7	7.05	6.8	5.2	5.5	7.70	7.73	8.0	7.74	5.6	5.5
Specific Conductivity	36.8	36.5	32.5	27.0	8.0	7.87	38.6	38.3	39.4	40.0	18.4	18.4	94.0	93.1	224.0	220.0	444.0	446.0
Colour	5.0	2.5	2.25	2.5	5.0	3.0	15.0	19.0	9.5	9.5	6.7	5.0	2.5	3.6	2.0	2.0	5.0	2.5
Reactive Silica	0.09	0.087	0.20	0.12	0.049	0.040	2.4	2.4	1.2	1.2	1.7	1.68	1.10	1.12	0.570	0.54	0.007	0.012
Nitrate/Nitrite	0.77	0.76	1.16	0.52	0.009	0.009	80.0	70.0	208.0	153.0	0.110	0.063	0.302	0.30	0.44	0.43	0.03	0.03

Note: Study Dates: L1 - April 1983; L3 - July 1983; L4 - October 1983; L5 - March 1984

conversion. This sample, bottled in the spring-summer of 1983, was analyzed internally at CCIW in August 1983 and found to contain about 0.6 µgN/mL. After study L-6 was complete the ammonia was found to be almost depleted and the nitrate and nitrite found to have increased to 1.16 µgN/L. A corresponding change in pH and conductance is also noted. The other precipitation sample (see Table 5) was quite well behaved.

Performance of Laboratories

A laboratory that analyzes all samples and most if not all constituents can be viewed as very satisfactory when no bias is discerned and it provides results that are not flagged. Unsatisfactory or poor performance can be identified if a lab has an extreme frequency of bias and/or flags. This approach was discussed in the report on study L-5.

Given in Table 6 is a summary of the frequency in which laboratories were seen with bias and with flags. The bias and flags frequency for study L-6 are abstracted from Table 3 and provided here for comparison to earlier studies. The frequency which is suggested as acceptable for a single study was given in an earlier report (L-5). The criteria are summarized below.

Satsifactory	if % bias is <15%	and % flags	<10%
Moderate	if % bias is >15 or <35%	and % flags	>10% or <25%
Poor	if % bias is >35%	and % flags	>25%

Table 6. Variation in % Bias and % Flags between Studies

Lab Code	% Bias (for parameter data sets)					% Flags (on all ranked results)				
	L-1	L-3	L-4	L-5	L-6	L-1	L-3	L-4	L-5	L-6
L002	30.7	25.0	7.7	8.3	0.0	5.9	11.7	7.7	6.5	8.0
L003	25.0	8.3	0.0	7.1	14.3	14.7	7.6	10.9	12.9	15.3
L004A	45.5	27.3	27.3	33.0	25.0	16.7	21.0	22.1	24.1	22.6
L004B	-	-	27.3	-	-	-	-	32.7	-	-
L005	-	-	-	-	0.0	-	-	-	-	25.0
L006	36.4	36.4	54.6	36.0	46.1	32.6	11.9	19.2	19.1	30.0
L007	50.0	44.4	-	20.0	11.1	33.6	46.3	-	30.0	1.1
L009	22.2	10.0	14.3	11.0	10.1	23.3	10.0	4.0	12.6	4.1
L010A	-	15.4	23.1	15.8	46.2	-	20.3	25.9	10.3	28.3
L010B	-	-	-	0.0	-	-	0	0	0.0	-
L011	41.7	23.1	36.4	16.7	0.0	11.8	20.8	21.6	20.2	4.4
L012	20.0	-	-	0.0	-	13.8	-	-	0.0	-
L013A	30.0	0.0	0.0	0.0	0.0	12.4	5.6	6.3	1.4	2.2
L013B	-	-	0.0	-	-	-	-	6.2	-	-
L014	16.7	16.7	10	0.0	0.0	12.0	17.0	17.7	18.4	18.5
L016	20.0	33.0	44.4	33.0	44.4	22.5	22.2	23.1	18.5	12.2
L018	-	-	-	50.0	-	-	-	-	26.5	-
L019	-	-	-	0.0	0.0	-	-	-	1.2	5.0
L020	33.3	27.3	0.0	0.0	15.4	17.9	12.6	13.6	10.7	5.7
L021A	45.4	556	-	-	36.4	40.3	44.2	-	-	24.7
L021B	33.0	-	44.4	44.0	-	43.1	-	25.3	12.3	-
L022	38.5	46.2	46.2	38.5	38.5	13.2	30.2	26.5	33.7	24.2
L023	30.8	0.0	7.7	0.0	7.7	24.8	12.0	6.0	11.6	9.9
L024	18.2	18.2	8.3	0.0	0.0	10.3	11.1	6.2	6.9	4.7
L025	-	15.4	0.0	11.0	11.1	-	12.8	11.0	15.3	11.4
L027	16.7	-	-	7.7	7.6	4.2	-	-	17.0	2.3
L028	-	-	-	50.0	100.0	-	-	-	50.0	57.9
L029	41.7	16.7	16.7	16.7	8.3	13.8	13.3	5.6	6.2	5.1
L030	-	-	33.0	0.0	14.2	-	-	9.4	9.4	0.0
L031A	7.1	8.3	16.7	0.0	8.3	1.8	7.0	14.1	5.5	6.11
L031B	-	-	-	0.0	-	-	-	-	0.0	-
L032	28.6	0.0	0.0	18.7	7.1	23.0	23.1	9.2	22.6	15.0
L033	-	23.1	9.1	8.3	0.0	-	38.7	19.7	26.9	31.0
L040	33.0	-	-	-	-	22.6	-	-	-	-
L041	-	16.7	-	-	-	-	3.4	-	-	-
L042	-	22.2	20.0	40.0	-	-	24.4	27.8	42.2	-
L044	-	33.3	44.4	-	-	-	32.2	36.8	-	-
L045	23.1	8.3	41.7	7.7	41.7	7.4	7.2	8.9	4.6	6.9
L046	-	38.5	15.4	30.3	33.3	-	24.2	17.2	23.4	14.8
L048	-	-	-	0.0	8.3	-	-	-	10.5	12.7
L049	-	-	-	15.4	38.5	-	-	-	29.7	15.0
L050	-	-	-	0.0	50.0	-	-	-	11.1	10.5
L053	11.1	-	22.2	0.0	-	2.1	-	6.1	1.0	-
L054	71.4	12.5	-	-	-	24.0	27.0	-	-	-
L056	66.7	30.0	-	-	-	63.1	42.7	-	-	-
L057	40.0	33.3	50.0	16.7	9.1	22.9	44.1	37.7	18.6	13.7
L058	0.0	8.3	27.3	0.0	0.0	0.5	8.9	10.7	7.8	11.3
L060	-	50.0	72.7	41.8	33.0	-	34.5	42.9	35.9	19.3
L061	-	-	11.0	0.0	0.0	-	-	8.2	6.0	0.0
L062	-	-	-	28.6	20.0	-	-	-	27.3	5.4
L063	-	-	-	14.3	20.0	-	-	-	25.8	8.8
L064	-	-	-	0.0	18.2	-	-	-	14.4	15.2
L066	-	-	-	0.0	30.0	-	-	-	13.9	2.1

The above criteria for single study performance was used in Table 3 to alert the laboratories underlined that problems of bias or precision required their attention.

To simplify the overview of laboratory assessment the frequency of bias and flags are combined to create Table 7. This format with similar criteria (given below) provides a convenient way of recognizing between studies those laboratories that are either satisfactory, moderate or poor.

Satisfactory	if	% bias + % flags	< 25%
Moderate	if	% bias + % flags	>25% or <60%
Poor	if	% bias + % flags	>60%

The above approach, although simple has merit in that laboratories designated as poor do indeed have difficulties in being comparable with their peer group. This comment may be verified by detailed scrutiny of the raw data (Appendix I) and their specific appraisals (Appendix II) found in each of the study reports. The connotation of poor does not mean they are unable to analyze soft waters but rather they are less qualified than their peers. Their peers are those labs identified as satisfactory. These laboratories are consistently found unbiased and are sufficiently precise to escape frequent flagging.

Regarding Table 7 some precautions are suggested. For instance the results in Table 7 reflect on the relative performance of labs who measured most but not necessarily all of the 14 parameters. Users of data may indeed be rewarded by a poor lab being able to

Table 7. Summary of Study to Study Performance

Lab Code	% Bias + % Flags on LRTAP Studies					Comments
	L-1	L-3	L-4	L-5	L-6	
L002	36.6	36.7	15.4	14.1	8.0	satisfactory and improving
L003	39.7	15.9	10.9	20.0	29.6	moderate to satisfactory
L004A	62.2	48.3	49.4	57.1	47.6	poor to moderate
L004B	-	-	60.0	-		poor
L005	-	-	-	-	25.0	moderate
L006	68.0	47.3	73.8	55.1	76.1	poor
L007	83.6	90.7	-	50.0	12.2	poor to moderate
L009	45.5	20.0	18.3	23.6	14.1	satisfactory
L010A	-	35.7	49.0	26.1	74.5	moderate to satisfactory
L010B	-	-	-	0.0	-	-
L011	53.5	43.9	58.0	36.9	4.4	moderate to satisfactory
L012	33.8	-	-	0.0	-	moderate and improving
L013A	35.6	5.6	6.3	1.4	2.2	satisfactory and improving
L013B	-	-	6.2	-	-	-
L014	28.7	33.7	27.7	18.4	18.5	moderate and improving
L016	42.5	55.2	57.5	51.5	56.6	moderate (little change)
L018	-	-	-	76.5	-	poor
L019	-	-	-	1.2	5.0	satisfactory
L020	51.2	39.9	13.6	10.7	21.1	moderate to satisfactory (improving)
L021A	85.7	99.8	-	-	61.1	por on two studies
L021B	76.1	-	69.7	56.3	-	poor to mdoerate
L022	51.7	76.4	72.7	72.2	62.7	poor
L023	55.6	12.0	13.7	11.6	17.6	satisfactory
L024	28.5	29.3	14.5	6.9	4.7	moderate to satisfactory (improving)
L025	-	28.2	11.0	26.3	22.5	satisfactory (little change)
L027	20.9	-	-	24.7	9.9	satisfactory (little change)
L028	-	-	-	100.0	157.9	poor (on two constituents)
L029	65.5	30.0	22.3	22.9	13.4	poor to satisfactory and improving
L030	-	-	42.4	7.4	14.2	moderate to satisfactory (improving)
L031A	8.9	15.3	30.8	5.5	14.4	satisfactory
L031B	-	-	-	0.0	-	satisfactory
L032	51.6	23.1	9.2	41.3	22.1	moderate to satisfactory (variable)
L033	-	61.8	28.8	35.2	25.0	poor to moderate
L040	55.6	-	-	-	-	moderate
L041	-	20.1	-	-	-	satisfactory (1 study)
L042	-	46.6	47.8	82.2	-	moderate to poor (needs attention)
L044	-	65.5	81.2	-	-	poor
L045	30.5	15.5	50.6	12.3	48.6	moderate to satisfactory
L046	-	62.7	32.6	53.7	48.1	poor to moderate
L048	-	-	-	10.5	21.0	satisfactory
L049	-	-	-	45.1	53.5	moderate
L050	-	-	-	11.1	60.5	moderate
L053	13.2	-	28.3	1.0	-	satisfactory
L054	95.4	39.5	-	-	-	poor to moderate
L056	129.8	72.7	-	-	-	poor
L057	62.9	77.4	87.1	35.3	22.8	poor to moderate
L058	0.5	17.2	38.0	7.8	11.3	satisfactory
L060	-	84.5	115.6	77.7	52.3	poor
L061	-	-	19.2	6.0	0.0	satisfactory
L062	-	-	-	55.9	2.54	moderate
L063	-	-	-	39.1	28.8	moderate
L064	-	-	-	14.4	33.4	satisfactory
L066	-	-	-	13.9	32.1	satisfactory

perform consistently very well on only 2 or 3 of these 14 parameters. Users of data and lab heads should review all details before reacting. These external details on lab quality are found in Appendix I and II of all study reports. Another issue to recognize is some labs were discerned as biased yet had no single results flagged. This situation occurs if the flagging criteria is perhaps too loose and when a precise lab has but a small systematic error. The magnitude of the bias may be minor for the demands of the users of data. This is an issue that requires consultation between the user of data and his client laboratory.

On an overall basis this study was rather well handled by the participants. Several are revealing improvements. This may reflect a successful and constructive reaction to the interlaboratory program. General comments overviewing each laboratory are noted in Table 7. For this report, these comments are provided to allow laboratory staff to put their performance in perspective with their peers and to provide users of data information on the comparability of their client laboratories.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the participants for the provision of their data, Mr. R. White and Dr. J. Clark of the International Joint Commission Great Lakes Regional Office (Windsor) for their computer programs and valuable assistance as well too to Mrs. K. Miles of the National Water Research Institute for her computer programming that made this study possible.

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7. Youden, W.J. and E.H. Steiner, "Statistical Manual of the Association of Official Analytical Chemists", AOAC, PO Box 540, Benjamin Franklin Station, Washington, DC, 20044 (1975).

8. "Guidelines for In-lab Quality Control for LRTAP Projects", A Report of the Ad-Hoc Work Group on Quality Control to the LRTAP Quality Assurance and Methods Subgroup of the Federal-Provincial Research and Monitoring Co-ordinating Committee. The Guidelines are available from the LRTAP Liaison Office, Atmospheric Environment Service, 4905 Dufferin Street, Downsview, Ontario M3H 5T4, Phone 416-667-4803/4885.

LIST OF PREVIOUS INTERLABORATORY STUDIES

1. K.I. Aspila and S. Todd, "LRTAP Intercomparison Study L-1: Major Ions, Nutrients and Physical Properties in Water", March 1983.

2. K.I. Aspila and S. Todd, "LRTAP Intercomparison Study L-2: Trace Metals in Water", March 1983.

3. K.I. Aspila and S. Todd, "LRTAP Intercomparison Study L-3, Major Ions, Nutrients and Physical Properties in Water", January 1984.

4. K.I. Aspila and S. Todd, "LRTAP Intercomparison Study L-4, Major Ions, Nutrients and Physical Properties in Water", February 1984.

5. K.I. Aspila and S. Todd, "LRTAP Intercomparison Study L-5, Major Ions, Nutrients and Physical Properties in Water", ~~September~~ July 1984.

Copies of these reports are available from:

LRTAP Liaison Office
Atmospheric Environment Service
4905 Dufferin Street
Downsview, Ontario M3H 5T4
Telephone: 416-667-4803/4885.

LIST OF PARTICIPANTS IN STUDY L-6

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Environment Canada

Environmental Conservation Service:
- Water Quality National Laboratory, Burlington, Ontario
- Water Qaulity Branch, Atlantic Region, Moncton, N.B.
- Water Quality Branch, Quebec Region, Longueuil, Quebec
- Water Quality Branch, Western Region, Saskatoon, Saskatchewan

Environmental Protection Service:
- Pacific Region, West Vancouver, B.C.
- Atlantic Region, Dartmouth, Nova Scotia

Canadian Forestry Service:
- Great Lakes Forest Research Centre, Sault Ste. Marie, Ontario
- Laurentian Forest Research Centre, Ste. Foy, Quebec
- Newfoundland Forest Research Centre, St. Johns, Nfld.

Department of Fisheries and Oceans

- Fresh Water Research Institute, Winnipeg, Manitoba
- Quebec Region, Quebec, Quebec

Agriculture Canada

- Atlantic Region, Fredericton, New Brunswick

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Ontario Ministry of Environment, Northwestern Regional Lab, (Thunder Bay, Ontario)

Ontario Ministry of Environment (The Precipitation, Anions and Rivers Laboratory), Rexdale, Ontario
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U.S. Geological Survey, National Water Quality Lab, Atlanta, Georgia
Pacific Northwest Laboratory, Richland, Washington
Rockwell International, New Bury Park, California

APPENDIX I: LABORATORY DATA

CONTENTS OF APPENDIX I

Parameter			Page Number
Ca	-	Calcium	1
Mg	-	Magnesium	5
Na	-	Sodium	9
K	-	Potassium	13
Cl	-	Chloride	17
SO_4	-	Sulphate	25
Acid	-	Acidity	34
Alk	-	Alkalinity	36
pH	-	pH	40
Spec Con	-	Specific Conductivity	44
Col	-	Colour	47
Si	-	Reactive Silica	49
NO_2+NO_3	-	(Nitrate + Nitrite)	51

84/06/26

PARAMETER: 20091 CALCIUM MG/L

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-ICNS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.50 BASIC ACCEPTABLE ERROR= .15 CONCENTRATION ERROR INCREMENT= .08
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	1.49	14.00	2.41	17.00	.30	14.50	7.91	14.00	3.87	7.00	5.48	10.00
L003	1.5	19.00	2.4	14.50	.29	10.00	8.0	16.50	4.0	12.00	5.7	20.00
L004	1.4	5.50	2.3	7.50	.3	14.50	7.5	4.50	3.8	3.50	5.3	7.00
L006	1.75 VH	34.00	2.70 VH	34.00	.55 VH	35.00	8.35	29.00	4.25	28.00	6.05 H	30.00
L007	1.63	31.50	2.53	31.00	.35	29.00	8.12	23.00	4.15	24.00	5.73	23.00
L009	1.6	29.50	2.5	29.50	.34	27.00	8.2	24.50	4.2	27.00	5.8	25.50
L010	1.6	29.50	2.5	29.50	.3	14.50	9.6 VH	34.00	4.8 VH	34.00	7.2 VH	34.00
L011A	1.44	11.50	2.48	26.00	.31	19.00	7.80	9.50	4.02	17.50	5.45	9.00
L013	1.51	24.00	2.43	20.00	.31	19.00	8.09	21.00	4.12	23.00	5.71	22.00
L014	1.70 H	33.00	2.20 L	3.50	.50 H	33.00	7.00 VL	2.00	4.00	12.00	5.10 L	5.00
L016	1.42	8.50	2.31	9.50	.31	19.00	7.79	8.00	3.89	9.00	5.42	8.00
L019	1.38	4.00	2.27	6.00	.23	2.50	8.31	28.00	4.48 VH	33.00	6.07 H	31.50
L020A	1.43	10.00	2.23 L	5.00	.33	25.00	7.55	6.00	3.79	2.00	5.26	6.00
L021	1.57	28.00	2.49	27.00	.37	30.00	8.52	33.00	4.02	17.50	4.86 VL	2.00
L022	1.4	5.50	2.3	7.50	.25	4.00	7.9	12.50	4.0	12.00	5.5	13.00
L023	2.63 VH	35.00	2.46	24.00	.32	21.50	8.28	27.00	4.18	26.00	5.82	27.00
L024	1.5	19.00	2.5	29.50	.23	2.50	8.5	31.50	4.3 H	30.50	6.0 H	29.00
L025	1.52	26.50	2.75 VH	35.00	.32	21.50	8.05	20.00	4.30 H	30.50	5.70	20.00
L027	1.51	24.00	2.40	14.50	.28	8.00	7.90	12.50	4.00	12.00	5.60	17.00
L029	1.30 L	3.00	2.37	12.00	.30	14.50	7.81	11.00	4.01	15.50	5.04 L	4.00
L031	1.50	19.00	2.47	25.00	.29	10.00	8.27	26.00	4.06	20.00	5.74	24.00
L032	1.42	8.50	2.43	20.00	.521 H	34.00	7.46	3.00	3.86	6.00	4.97 VL	3.00
L033	.8 VL	1.00	1.6 VL	1.00	.2W	1.00	7.8	9.50	3.5 VL	1.00	4.2 VL	1.00
L045	1.49	14.00	2.43	20.00	.27	6.50	8.10	22.00	4.01	15.50	5.58	15.00
L046	1.43	14.00	2.42	18.00	.39	31.00	1.86 VL	1.00	4.26	29.00	6.07 H	31.50
L048	1.49	11.50	2.45	23.00	.33	25.00	8.0	16.50	4.1	21.50	5.9	28.00
L049	1.5	19.00	2.5	29.50	.3	14.50	8.2	24.50	4.1	21.50	5.6	17.00
L057	1.63	31.50	2.36	11.00	.27	6.50	7.56	7.00	4.04	19.00	6.23 VH	33.00
L058	1.5	19.00	2.4	14.50	.3	14.50	8.5	31.50	4.4 H	32.00	5.6	17.00
L060	1.22 VL	2.00	2.00 VL	2.00	.40	32.00	7.50	4.50	3.88	8.00	5.50	13.00
L061	1.51	24.00	2.44	22.00	.343	28.00		0.00		0.00		0.00
L062	1.41	7.00	2.31	9.50	.29	10.00	8.02	19.00	3.85	5.00	5.49	11.00
L063	1.5	19.00	2.2 L	3.50	.26	5.00	8.0	16.50	3.8	3.50	5.5	13.00
L064	1.5	19.00	2.4	14.50	.33	25.00	8.0	16.50	4.0	12.00	5.7	20.00
L066	1.52	26.50	2.52	32.00	.321	23.00	8.37	30.00	4.17	25.00	5.80	25.50
MEDIAN CONC.	1.500		2.420		.310		8.000		4.020		5.600	

PARAMETER: 20091 CALCIUM MG/L

84/06/26

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	1.28	8.00	13.1	17.50	25.2	7.00	40.8	5.50
L003	1.3	13.50	13.0	14.00	27.0	22.00	43.0	22.50
L004	1.3	13.50	12.7	8.00	26.0	10.50	41.0	8.50
L006	1.60 VH	32.50	14.70 VH	33.00	29.30 VH	32.00	45.75	32.00
L007	1.42	28.00	13.2	19.50	27.6	28.50	43.3	27.00
L009	1.4	24.00	13.0	14.00	26.3	14.00	41.6	12.00
L010	1.6 VH	32.50	16.9 VH	34.00	35.4 VH	34.00	54.9 VH	34.00
L011A	1.29	9.00	12.6	7.00	25.9	8.50	40.8	5.50
L013	1.32	19.00	13.1	17.50	26.5	16.00	42.8	18.00
L014	1.40	24.00	14.5 H	31.50	27.6	28.50	44.2	29.00
L018	1.30	13.50	12.74	9.00	24.00 L	1.00	42.20	15.00
L019	1.32	19.00	13.4	23.00	27.4	26.50	43.2	25.00
L020A	1.24	7.00	12.9	10.00	27.4	26.50	44.4	30.00
L021	1.41	27.00	13.46	25.00	27.03	24.00	44.06	28.00
L022	1.2	3.50	13.	14.00	26.	10.50	41.	8.50
L023	2.14 VH	34.00	13.4	23.00	26.1	12.00	42.4	17.00
L024	1.3	13.50	14.	29.50	27.	22.00	43.	22.50
L025	1.44	29.00	13.60	27.50	26.2	13.00	34.0 VL	1.00
L027	1.37	21.00	12.95	11.00	26.8	20.00	43.25	26.00
L029	1.23	5.50	12.1 L	4.50	25.8	8.50	40.2	4.00
L031	1.32	19.00	13.6	27.50	28.3	30.50	44.7	31.00
L032	1.58 VH	31.00	12.5	6.00	24.1 L	2.00	38.2 L	2.00
L033	.7 VL	1.00	14.5 H	31.50	30.0 VH	33.00	42.0	13.50
L045	1.30	13.50	13.4	23.00	26.5	16.00	42.9	19.50
L046	1.40	24.00	13.2	19.50	26.6	18.50	41.4	11.00
L048	1.30	13.50	13.0	14.00	26.6	18.50	43.0	22.50
L049	1.3	13.50	13.0	14.00	27.	22.00	42.	13.50
L057	1.53 H	30.00	12.1 L	4.50	25.0	4.50	39.3	3.00
L058	1.4	24.00	14.0	29.50	28.0	30.50	48.0 VH	33.00
L060	1.12 L	2.00	11.7 L	1.00	25.0	4.50	43.0	22.50
L061		0.00		0.00		0.00		0.00
L062	1.23	5.50	13.3	21.00	27.2	25.00	42.9	19.50
L063	1.2	3.50	12. L	2.50	25.	4.50	41.	8.50
L064	1.3	13.50	12. L	2.50	25.	4.50	41.	8.50
L066	1.40	24.00	13.5	26.00	26.5	16.00	42.3	16.00
MEDIAN CONC.	1.310		13.100		26.550		42.600	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	114.50	11.450	10			
L003	164.00	16.400	10			FLAME AAS
L004	83.00	8.300	10			20103
L005	313.50	31.950	10	VHVHVHHVHVHVH	BIASED HIGH	FLAME-AAS
L007	266.50	26.650	10			AAS
L008	227.00	22.700	10			
L010	310.00	31.000	10	VHVHVHVHVHVHVH	BIASED HIGH	EXRACTABLE ICAP
L011A	122.50	12.250	10			
L013	199.50	19.950	10			FLAME-AAS
L014	201.50	20.150	10	HLHVLLH		AAS
L016	100.50	10.050	10	L		AAS
L019	198.50	19.850	10	VHH		IC
L020A	127.50	12.750	10	L		ICP
L021	241.50	24.150	10	VL		FLAME AAS
L022	91.00	9.100	10			
L023	246.50	24.650	10	VHVH		ICAP,FLAME AAS
L024	229.50	22.950	10	HH		
L025	224.00	22.400	10	VHHVL		
L027	166.00	16.600	10			
L029	82.50	8.250	10	LLL		AAS
L031	232.00	23.200	10			
L032	115.50	11.550	10	HVLVHLL		
L033	93.50	9.350	10	VLVLVLVLVLHVH		AUTO AAS
L045	165.00	16.500	10			ICP
L046	197.50	19.750	10	VLH		AA-N2O/C2H2
L048	194.00	19.400	10			FLAME AAS
L049	189.00	18.900	10			FLAME-AAS
L057	150.00	15.000	10	VHHL		FLAME AAS
L058	245.50	24.550	10	HVH		FLAME-AAS
L060	91.50	9.150	10	VLVLLL		AAS
L061	74.00	24.667	3		INSUFFICIENT DATA	FLAME-ASS
L062	132.50	13.250	10			AAS
L063	79.50	7.950	10	LL	BIASED LOW	AAS
L064	136.00	13.600	10	L		ICP
L066	244.00	24.400	10			FLAME-AAS

OVERALL AVERAGE RANK IS 17.653

CALCIUM

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L063	79.50	7.950	10	LL	BIASED LOW	AAS
L029	82.50	8.250	10	LLL		AAS
L004	83.00	8.300	10			20103
L022	91.00	9.100	10			
L060	91.50	9.150	10	VLVLLL		AAS
L033	93.50	9.350	10	VLVLVLVLVLHVH		AUTO AAS
L016	100.50	10.050	10	L		AAS
L002	114.50	11.450	10			
L032	115.50	11.550	10	HVLVHLL		
L011A	122.50	12.250	10			
L020A	127.50	12.750	10	L		ICP
L062	132.50	13.250	10			AAS
L064	136.00	13.600	10	L		ICP
L057	150.00	15.000	10	VHHL		FLAME AAS
L003	164.00	16.400	10			FLAME AAS
L045	165.00	16.500	10			ICP
L027	166.00	16.600	10			
L049	189.00	18.900	10			FLAME-AAS
L048	194.00	19.400	10			FLAME AAS
L046	197.50	19.750	10	VLH		AA-N20/C2H2
L019	198.50	19.850	10	VHH		IC
L013	199.50	19.950	10			FLAME-AAS
L014	201.50	20.150	10	HLHVLLH		AAS
L025	224.00	22.400	10	VHHVL		
L009	227.00	22.700	10			
L024	229.50	22.950	10	HH		
L031	232.00	23.200	10			
L021	241.50	24.150	10	VL		FLAME AAS
L066	244.00	24.400	10			FLAME-AAS
L058	245.50	24.550	10	HVH		FLAME-AAS
L023	246.50	24.650	10	VHVH		ICAP,FLAME AAS
L061	74.00	24.667	3		INSUFFICIENT DATA	FLAME-ASS
L007	266.50	26.650	10			AAS
L010	310.00	31.000	10	VHVHVHVHVHVHVH	BIASED HIGH	EXRACTABLE ICAP
L006	319.50	31.950	10	VHVHVHHVHVHVH	BIASED HIGH	FLAME-AAS

OVERALL AVEPAGE RANK IS 17.653

84/06/26

PARAMETER: 12091 MAGNESIUM MG/L

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.00 BASIC ACCEPTABLE ERROR= .05 CONCENTRATION ERROR INCREMENT= .10
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.34	15.00	.75	24.50	.7 VH	35.00	1.53	10.50	.99	10.50	.51	14.50
L003	.35	23.50	.74	20.50	.05T	4.00	1.5	5.00	.96	5.00	.54	27.00
L004	.3	2.00	.7	5.00	.1	29.50	1.5	5.00	1.0	16.50	.5	9.00
L006	2.20 VH	35.00	1.90 VH	35.00	.57 VH	34.00	2.25 VH	34.00	1.50 VH	34.00	.66 VH	33.00
L007	.34	15.00	.72	12.50	.06	11.50	1.59	15.00	1.00	16.50	.51	14.50
L009	.33	9.50	.74	20.50	.074	26.00	1.6	20.50	1.0	16.50	.49	6.00
L010	.4 H	31.00	.8 H	31.00	.1	29.50	1.9 VH	32.00	1.2 VH	31.00	.6 VH	30.50
L011A	.33	9.50	.75	24.50	.06	11.50	1.50	5.00	1.00	16.50	.48	3.50
L013	.35	23.50	.75	24.50	.03	11.50	1.64	26.00	1.03	26.00	.53	25.00
L014	.40 H	31.00	.80 H	31.00	.12	29.50	1.60	20.50	1.10 VH	29.00	.60 VH	30.50
L016	.31	4.50	.66 L	1.00	.06	11.50	1.37 VL	1.00	.93 L	2.00	.47	1.50
L019	.32	6.50	.70	5.00	.06	11.50	1.56	13.00	1.02	23.50	.50	9.00
L020A	.35	23.50	.69	2.00	.08	27.00	1.52	8.50	.96	5.00	.51	14.50
L021	.47 VH	33.00	1.08 VH	34.00	.05	4.00	2.18 VH	33.00	1.48 VH	33.00	.70 VH	34.00
L022	.30	2.00	.70	5.00	.05	4.00	1.5	5.00	.96	5.00	.48	3.50
L023	.345	19.50	.98 VH	33.00	.070	23.00	1.84 VH	31.00	1.22 VH	32.00	.63 VH	32.00
L024	.32	6.50	.74	20.50	.04	1.50	1.6	20.50	1.0	16.50	.51	14.50
L025	.345	19.50	.800 H	31.00	.070	23.00	1.55	12.00	.600 VL	1.00	.515	17.00
L027	.33	9.50	.72	12.50	.06	11.50	1.50	5.00	.99	10.50	.50	9.00
L029	.310	4.50	.70	5.00	.058	6.00	1.49	2.00	1.00	16.50	.482	5.00
L031	.34	15.00	.74	20.50	.07	23.00	1.64	26.00	1.02	23.50	.52	21.00
L032	.393	29.00	.720	12.50	.120 H	32.00	1.52	8.50	.981	9.00	.501	12.00
L033	.41 H	31.00	.76	27.50	.10	29.50	1.60	20.50	1.08 VH	28.00	.55	29.00
L045	.34	15.00	.75	24.50	.06	11.50	1.64	26.00	1.02	23.50	.52	21.00
L046	.35	23.50	.73	16.50	.066	18.50	1.59	15.00	1.00	16.50	.52	21.00
L048	.33	9.50	.72	12.50	.07	23.00	1.60	20.50	1.00	16.50	.50	9.00
L049	.3	2.00	.7	5.00	.16	11.50	1.6	20.50	1.0	16.50	.5	9.00
L057	.52 VH	34.00	.71	8.00	.04	1.50	1.53	10.50	.94 L	3.00	.47	1.50
L058	.36	27.00	.79 H	29.00	.06	11.50	1.7	29.00	1.11 VH	30.00	.54	27.00
L060	.39	28.00	.76	27.50	.15 VH	33.00	1.70	29.00	1.05	27.00	.52	21.00
L061	.336	12.00	.719	9.00	.068	20.00		0.00		0.00		0.00
L062	.35	23.50	.73	16.50	.07	23.00	1.59	15.00	.97	7.50	.52	21.00
L063	.34	15.00	.72	12.50	.06	11.50	1.6	20.50	.97	7.50	.52	21.00
L064	.35	23.50	.72	12.50	.063	17.00	1.7	29.00	1.0	16.50	.54	27.00
L066	.343	18.00	.734	18.00	.066	18.50	1.60	20.50	1.02	23.50	.520	21.00
MEDIAN CONC.	.343		.734		.066		1.600		1.000		.518	

PARAMETER: 12091 MAGNESIUM MG/L 84/06/26

SAMPLE	7		8		9		11	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.28	10.00	2.6	9.00	7.4	7.50	9.1	9.00
L003	.29	16.50	2.7	17.50	7.7	17.50	9.9	28.00
L004	.3	25.50	2.6	9.00	7.7	17.50	9.4	18.00
L005	.41 VH	33.00	3.45 VH	33.00	10.70 VH	34.00	10.10	31.00
L007	.28	10.00	2.72	20.50	7.8	20.50	9.5	20.00
L009	.21 VL	1.00	2.8	23.50	7.7	17.50	9.2	13.50
L010	.3	25.50	3.4 VH	31.00	10.0 VH	33.00	11.8 VH	34.00
L011A	.27	5.50	2.60	9.00	7.50	9.00	9.00	6.50
L013	.30	25.50	2.70	17.50	7.84	22.00	9.56	21.00
L014	.50 VH	34.00	2.51	2.50	7.30	5.00	8.26 L	2.00
L016	.29	16.50	2.54	4.00	7.00	2.00	9.00	6.50
L019	.27	5.50	2.81	25.00	8.12	26.00	9.76	25.00
L020A	.27	5.50	2.51	2.50	7.21	3.00	8.51	3.00
L021	.38 VH	32.00	3.74 VH	34.00	9.18 VH	32.00	9.67	22.00
L022	.25	2.50	2.6	9.00	7.4	7.50	9.1	9.00
L023	.290	16.50	3.04 VH	29.00	8.32	28.00	9.92	29.00
L024	.25	2.50	2.8	23.50	7.6	12.50	9.7	24.00
L025	.300	25.50	2.62	13.00	7.70	17.50	7.50 VL	1.00
L027	.28	10.00	2.6	9.00	7.25	4.00	9.25	16.00
L029	.276	8.00	2.66	14.00	7.87	23.00	9.68	23.00
L031	.29	16.50	2.83	26.00	8.23	27.00	9.84	27.00
L032	.358 H	31.00	2.55	5.00	7.53	10.00	9.23	15.00
L033	.32	29.00	2.95 H	27.00	8.35	29.00	10.00	30.00
L045	.29	16.50	2.79	22.00	8.11	25.00	9.83	26.00
L046	.29	16.50	2.72	20.50	7.67	15.00	9.16	12.00
L048	.29	16.50	2.7	17.50	7.6	12.50	9.4	18.00
L049	.3	25.50	2.6	9.00	7.6	12.50	9.1	9.00
L057	.29	16.50	3.07 VH	30.00	7.31	6.00	8.68	4.00
L058	.27	5.50	3.0 H	28.00	8.7 H	31.00	10.4 H	32.50
L060	.33	30.00	3.41 VH	32.00	8.50 H	30.00	10.4 H	32.50
L061		0.00		0.00		0.00		0.00
L062	.29	16.50	2.47 L	1.00	6.78 L	1.00	8.93	5.00
L063	.29	16.50	2.6	9.00	7.8	20.50	9.2	13.50
L064	.30	25.50	2.7	17.50	7.9	24.00	9.4	18.00
L066	.292	22.00	2.69	15.00	7.60	12.50	9.14	11.00
MEDIAN CONC.	.290		2.700		7.703		9.400	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	145.50	14.550	10	VH		
L003	164.50	16.450	10			FLAME AAS
L004	137.00	13.700	10			12102
L006	336.00	33.600	10	VHVHVHVHVHVHVHVHVH	BIASED HIGH	FLAME-AAS
L007	156.00	15.600	10			AAS
L009	154.50	15.450	10	VL		
L010	308.50	30.850	10	HHVHVHVHVHVHVH	BIASED HIGH	EXTRACTABLE ICAP
L011A	100.50	10.050	10			
L013	222.50	22.250	10			FLAME-AAS
L014	215.00	21.500	10	HHVHVHVHL		AAS
L016	50.50	5.050	10	LVLL	BIASED LOW	AAS
L019	150.00	15.000	10			IC
L020A	94.50	9.450	10			ICP
L021	291.00	29.100	10	VHVHVHVHVHVHVHVHVH	BIASED HIGH	FLAME AAS
L022	52.50	5.250	10		BIASED LOW	
L023	273.00	27.300	10	VHVHVHVHVH	BIASED HIGH	ICAP,FLAME AAS
L024	142.50	14.250	10			
L025	160.50	16.050	10	HVLVL		
L027	97.00	9.700	10			
L029	107.00	10.700	10			AAS
L031	225.50	22.550	10			
L032	164.00	16.400	10	HH		
L033	280.50	28.050	10	HVHH	BIASED HIGH	AUTO AAS
L045	211.00	21.100	10			ICP
L046	175.00	17.500	10			AAS
L048	155.50	15.550	10			FLAME AAS
L049	120.50	12.050	10			FLAME-AAS
L057	115.00	11.500	10	VHLVH		FLAME AAS
L058	250.50	25.050	10	HVHHHH		FLAME AAS
L060	290.00	29.000	10	VHVHHH	BIASED HIGH	ICAP
L061	41.00	13.667	3		INSUFFICIENT DATA	FLAME-AAS
L062	130.00	13.000	10	LL		AAS
L063	147.50	14.750	10			AAS
L064	210.50	21.050	10			ICP
L066	180.00	18.000	10			FLAME

OVERALL AVERAGE RANK IS 17.653

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L016	50.50	5.050	10	LVLL	BIASED LOW	AAS
L022	52.50	5.250	10		BIASED LOW	
L020A	94.50	9.450	10			ICP
L027	97.00	9.700	10			
L011A	100.50	10.050	10			
L029	107.00	10.700	10			AAS
L057	115.00	11.500	10	VHLVH		FLAME AAS
L049	120.50	12.050	10			FLAME-AAS
L062	130.00	13.000	10	LL		AAS
L061	41.00	13.667	3		INSUFFICIENT DATA	FLAME-AAS
L004	137.00	13.700	10			12102
L024	142.50	14.250	10			
L002	145.50	14.550	10	VH		
L063	147.50	14.750	10			AAS
L019	150.00	15.000	10			IC
L009	154.50	15.450	10	VL		
L04A	155.50	15.550	10			FLAME AAS
L007	156.00	15.600	10			AAS
L025	160.50	16.050	10	HVLVL		
L032	164.00	16.400	10	HH		
L003	164.50	16.450	10			FLAME AAS
L046	175.00	17.500	10			AAS
L066	180.00	18.000	10			FLAME
L064	210.50	21.050	10			ICP
L045	211.00	21.100	10			ICP
L014	215.00	21.500	10	HHVHVHVHL		AAS
L013	222.50	22.250	10			FLAME-AAS
L031	225.50	22.550	10			
L058	250.50	25.050	10	HVHHHH		FLAME AAS
L023	273.00	27.300	10	VHVHVHVHVH	BIASED HIGH	ICAP,FLAME AAS
L033	280.50	28.050	10	HVHH	BIASED HIGH	AUTO AAS
L060	290.00	29.000	10	VHVHHH	BIASED HIGH	ICAP
L021	291.00	29.100	10	VHVHVHVHVHVHVHVH	BIASED HIGH	FLAME AAS
L010	308.50	30.850	10	HHVHVHVHVHVHVH	BIASED HIGH	EXTRACTABLE ICAP
L006	336.00	33.600	10	VHVHVHVHVHVHVHVHVH	BIASED HIGH	FLAME-AAS

OVERALL AVERAGE RANK IS 17.653

84/06/26

PARAMETER: 11091 SODIUM MG/L

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .50 BASIC ACCEPTABLE ERROR= .20 CONCENTRATION ERROR INCREMENT= .14
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.30	12.50	.06	20.00	.53	22.50	1.94	19.50	1.31	22.00	.60	15.50
L003	.1 L	1.00	.05	11.00	.5	12.50	2.0	24.00	1.2	6.50	.7	27.00
L004	.3	12.50	.1	28.00	.5	12.50	1.8	4.50	1.2	6.50	.6	15.50
L006	.72 VH	34.00	.62 VH	35.00	.66	34.00	3.45 VH	35.00	2.35 VH	35.00	.97 VH	34.00
L007	.43	28.50	.08	24.00	.65	33.00	1.95	21.50	1.43	29.00	.77	30.00
L009	.32	20.50	.06	20.00	.53	22.50	1.8	4.50	1.2	6.50	.62	19.50
L010	.4	25.50	.2T	31.00	.5	12.50	2.3	33.00	1.5	31.00	.7	27.00
L011A	.30	12.50	.09T	26.00	.51	17.50	1.94	19.50	1.24	11.00	.56	2.00
L013	.30	12.50	.04	5.00	.51	17.50	1.89	12.00	1.27	16.00	.59	10.00
L014	.50	31.00	.30 H	32.00	.60	30.00	2.00	24.00	1.40	26.50	.70	27.00
L016	.28	5.00	.04	5.00	.43	1.00	1.59	1.00	1.13	2.00	.58	6.50
L019	.32	20.50	.06	20.00	.52	20.50	2.01	26.00	1.30	20.00	.63	21.50
L020A	.4	25.50	.1	28.00	.6	30.00	2.1	29.00	1.4	26.50	.8	31.50
L020B	.31	18.50	.07	23.00	.51	17.50	1.84	8.00	1.23	10.00	.65	24.00
L021	.35	23.00	.05	11.00	.51	17.50	1.95	21.50	1.26	14.50	.60	15.50
L022	.28	5.00	.01T	1.00	.46	4.00	1.9	13.50	1.2	6.50	.57	3.50
L023	2.91 VH	35.00	.05	11.00	.50	12.50	1.88	11.00	1.33	23.50	.62	19.50
L024	.29	7.50	.05	11.00	.54	25.00	1.8	4.50	1.3	20.00	.69	25.00
L025	.330	22.00	.045	7.00	.540	25.00	2.02	27.00	1.40	26.50	.635	23.00
L027	.30	12.50	.05	11.00	.50	12.50	1.91	15.50	1.26	14.50	.60	15.50
L029	.271	2.00	.037	3.00	.488	8.00	1.71	2.00	1.17	3.00	.576	5.00
L031	.30	12.50	.06	20.00	.49	9.00	1.84	8.00	1.20	6.50	.58	6.50
L032	.277	3.00	.055	15.00	.476	6.00	1.92	17.50	1.33	23.50	.587	8.00
L033	1.H	0.00	1.H	0.00	1.H	0.00	2.	24.00	1.H	1.00	6. VH	35.00
L045	.3	12.50	.02T	2.00	.5	12.50	1.9	13.50	1.2	6.50	.6	15.50
L046	.56 H	32.00	.36 H	33.00	.77 H	35.00	2.09	28.00	1.54	33.00	.89 H	33.00
L048	.28	5.00	.48 VH	34.00	.48	7.00	2.2	31.00	1.5	31.00	.55	1.00
L049	.4	25.50	.1	28.00	.6	30.00	2.2	31.00	1.5	31.00	.8	31.50
L057	.43	28.50	.11	30.00	.52	20.50	1.84	8.00	1.25	12.50	.59	10.00
L058	.30	12.50	.06	20.00	.44	2.50	2.61 VH	34.00	1.65 H	34.00	.60	15.50
L060	.31	18.50	.05	11.00	.54	25.00	1.91	15.50	1.29	17.50	.63	21.50
L061	.309	17.00	.056	16.00	.531	28.00		0.00		0.00		0.00
L062	.29	7.50	.05	11.00	.44	2.50	1.87	10.00	1.25	12.50	.59	10.00
L063	.66 VH	33.00	.04	5.00	.47	5.00	1.8	4.50	1.3	20.00	.57	3.50
L064	.40	25.50	.084	25.00	.58	27.00	2.2	31.00	1.4	26.50	.71	29.00
L066	.443	30.00	.057	17.00	.638	32.00	1.92	17.50	1.29	17.50	.595	12.00
MEDIAN CONC.	.310		.060		.510		1.920		1.290		.600	

PARAMETER: 11091 SODIUM MG/L 84/06/26

SAMPLE LAB NO	7 REPORTED VALUE	7 RANK	8 REPORTED VALUE	8 RANK	9 REPORTED VALUE	9 RANK	10 REPORTED VALUE	10 RANK
L002	.53	18.50	1.29	21.00	4.13	26.00	18.4	6.00
L003	.6	25.00	1.2	8.50	4.1	22.50	19.0	16.00
L004	.5	12.00	1.2	8.50	4.1	22.50	18.5	7.00
L006	.93 VH	33.00	2.12 VH	34.30	6.35 VH	35.00	21.85 H	30.00
L007	.67	28.00	1.40	29.00	4.0	13.00	19.4	23.50
L009	.54	21.00	1.2	8.50	3.9	4.50	17.1	2.00
L010	.6	25.00	1.5	31.50	5.2 VH	33.00	24.4 VH	33.50
L011A	.50	12.00	1.22	14.00	4.05	17.50	38.6 VH	35.00
L013	.48	5.00	1.23	16.00	3.97	10.00	19.3	21.00
L014	.70	29.50	1.30	23.00	4.00	13.00	18.0	4.50
L015	.52	15.50	.93 L	1.00	2.71 VL	1.00	19.50	25.00
L019	.53	18.50	1.23	16.00	4.15	27.00	19.7	27.00
L020A	.6	25.00	1.4	29.00	4.4	30.00	19.4	23.50
L020B	.52	15.50	1.24	18.00	4.31	29.00	22.5 H	32.00
L021	.50	12.00	1.20	8.50	3.89	2.00	19.54	26.00
L022	.47	2.50	1.2	8.50	4.1	22.50	19.	16.00
L023	3.75 VH	34.00	1.23	16.00	3.96	8.50	18.8	12.00
L024	.53	18.50	1.2	8.50	4.0	13.00	19.	16.00
L025	.560	22.00	1.32	25.00	4.12	25.00	15.2 L	1.00
L027	.50	12.00	1.18	3.00	4.05	17.50	20.0	28.50
L029	.492	9.00	1.14	2.00	4.05	17.50	17.9	3.00
L031	.49	8.00	1.20	8.50	4.05	17.50	19.3	21.00
L032	.488	7.00	1.33	26.00	4.30	28.00	18.7	9.50
L033	1.H	0.00	1.H	0.00	4.	13.00	19.	16.00
L045	.5	12.00	1.2	8.50	3.9	4.50	18.0	4.50
L046	.85 VH	32.00	1.34	27.00	4.49	31.00	18.7	9.50
L048	.48	5.00	2.0 VH	33.00	3.9	4.50	18.7	9.50
L049	.7	29.50	1.5	31.50	4.5	32.00	20.	28.50
L057	.58	23.00	1.21	13.00	3.90	4.50	19.3	21.00
L058	.47	2.50	1.3	23.00	4.0	13.00	24.4 VH	33.50
L060	.53	18.50	1.26	20.00	3.96	8.50	19.0	16.00
L061		0.00		0.00		0.00		0.00
L062	.48	5.00	1.19	4.00	3.95	7.00	19.0	16.00
L063	.46	1.00	1.3	23.00	4.1	22.50	19.	16.00
L064	.62	27.00	1.4	29.00	5.3 VH	34.00	22. H	31.00
L066	.714	31.00	1.25	19.00	4.09	20.00	18.7	9.50
MEDIAN CONC.	.530		1.235		4.050		19.000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	183.50	18.350	10			
L003	154.00	15.400	10	L		FLAME
L004	129.50	12.950	10			11105
L006	339.00	33.900	10	VHVHVHVHVHVHVHVHH	BIASED HIGH	FLAME-AAS
L007	259.50	25.950	10			EMISSION
L009	129.50	12.950	10			
L010	283.00	28.300	10	VHVH		EXTRACTABLE ICAP
L011A	167.00	16.700	10	VH		
L013	125.00	12.500	10			IC
L014	240.50	24.050	10	H		AAS
L016	63.00	6.300	10	LVL	BIASED LOW	AAS
L019	217.00	21.700	10			IC
L020A	278.00	27.800	10			AUTO COL. FLAME
L020B	195.50	19.550	10	H		IC
L021	151.50	15.150	10			IC
L022	83.00	8.300	10		BIASED LOW	
L023	183.00	18.300	10	VHVH		ICAP,FLAME AAS
L024	149.00	14.900	10			
L025	203.50	20.350	10	L		
L027	142.50	14.250	10			
L029	54.50	5.450	10		BIASED LOW	AAS
L031	117.50	11.750	10			
L032	143.50	14.350	10			
L033	89.00	17.800	5	VH	INSUFFICIENT DATA	AUTO FLAME
L045	92.00	9.200	10			FLAME-AAS
L046	293.50	29.350	10	HHHHVH	BIASED HIGH	AAS
L048	161.00	16.100	10	VHVH		IC
L049	298.50	29.850	10		BIASED HIGH	FLAME-AAS
L057	171.00	17.100	10			FLAME EMISS.
L058	190.50	19.050	10	VHHVH		FLAME AAS
L060	172.00	17.200	10			AAS
L061	61.00	20.333	3		INSUFFICIENT DATA	FLAME-AAS
L062	85.50	8.550	10			AAS
L063	133.50	13.350	10	VH		AAS
L064	285.00	28.500	10	VHH	BIASED HIGH	FLAME AAS
L066	205.50	20.550	10			FLAME

OVERALL AVERAGE RANK IS 17.902

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L029	54.50	5.450	10		BIASED LOW	AAS
L016	63.00	6.300	10	LVL	BIASED LOW	AAS
L022	83.00	8.300	10		BIASED LOW	
L062	85.50	8.550	10			AAS
L045	92.00	9.200	10			FLAME-AAS
L031	117.50	11.750	10			
L013	125.00	12.500	10			IC
L009	129.50	12.950	10			
L004	129.50	12.950	10			11105
L063	133.50	13.350	10	VH		AAS
L027	142.50	14.250	10			
L032	143.50	14.350	10			
L024	149.00	14.900	10			
L021	151.50	15.150	10			IC
L003	154.00	15.400	10	L		FLAME
L048	161.00	16.100	10	VHVH		IC
L011A	167.00	16.700	10	VH		
L057	171.00	17.100	10			FLAME EMISS.
L060	172.00	17.200	10			AAS
L033	89.00	17.800	5	VH	INSUFFICIENT DATA	AUTO FLAME
L023	183.00	18.300	10	VHVH		ICAP,FLAME AAS
L002	183.50	18.350	10			
L058	190.50	19.050	10	VHHVH		FLAME AAS
L020B	195.50	19.550	10	H		IC
L061	61.00	20.333	3		INSUFFICIENT DATA	FLAME-AAS
L025	203.50	20.350	10	L		
L066	205.50	20.550	10			FLAME
L019	217.00	21.700	10			IC
L014	240.50	24.050	10	H		AAS
L007	259.50	25.950	10			EMISSION
L020A	278.00	27.800	10			AUTO COL. FLAME
L010	283.00	28.300	10	VHVH		EXTRACTABLE ICAP
L064	285.00	28.500	10	VHH	BIASED HIGH	FLAME AAS
L046	293.50	29.350	10	HHHHVH	BIASED HIGH	AAS
L049	298.50	29.850	10		BIASED HIGH	FLAME-AAS
L006	339.00	33.900	10	VHVHVHVHVHVHVHVHHH	BIASED HIGH	FLAME-AAS
OVERALL AVERAGE RANK IS		17.902				

PARAMETER: 19091 POTASSIUM MG/L

84/06/26

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .20 BASIC ACCEPTABLE ERROR= .05 CONCENTRATION ERROR INCREMENT= .16
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE LAB NO	1 REPORTED VALUE	1 RANK	2 REPORTED VALUE	2 RANK	3 REPORTED VALUE	3 RANK	4 REPORTED VALUE	4 RANK	5 REPORTED VALUE	5 RANK	6 REPORTED VALUE	6 RANK
L002	.14	14.50	.09	16.50	.34	23.00	.61	17.00	.86	22.50	.23	17.00
L003	.1	2.50	.06	3.00	.3	8.00	.6	11.00	.8	5.00	.2	4.00
L004	.1	2.50	.1	25.00	.3	8.00	.5	1.00	.7	1.00	.2	4.00
L006	.26 VH	35.00	.21 VH	34.00	.39	34.00	.68	30.00	.93	31.00	.34 VH	34.00
L007	.16	25.00	.09	16.50	.35	28.00	.71	33.50	.94	32.50	.26	29.00
L009	.14	14.50	.09	16.50	.33	20.00	.60	11.00	.83	14.50	.23	17.00
L010	.16	25.00	.10	25.00	.35	28.00	.64	26.50	.88	24.00	.25	26.00
L011A	.17	29.00	.08	9.50	.31	11.50	.70	31.50	.94	32.50	.23	17.00
L013	.13	10.50	.09	16.50	.32	15.00	.62	20.00	.85	19.50	.22	12.00
L014	.20 H	33.00	.20 VH	33.00	.30	8.00	.70	31.50	.90	26.50	.30 H	32.50
L016	.12	8.00	.05	1.00	.23	4.50	.56	3.00	.77	2.50	.21	7.00
L019	.16	25.00	.10	25.00	.32	15.00	.60	11.00	.84	16.50	.24	22.00
L020A	.1	2.50	.1	25.00	.3	8.00	.6	11.00	.9	26.50	.2	4.00
L020B	.15	20.00	.10	25.00	.32	15.00	.61	17.00	.84	16.50	.23	17.00
L021	.16	25.00	.06	3.00	.33	20.00	.62	20.00	1.03 H	35.00	.21	7.00
L022	.18	31.00	.09T	16.50	.29	4.50	.64	26.50	.82	11.00	.22	12.00
L023	.12	8.00	.08	9.50	.30	8.00	.60	11.00	.82	11.00	.22	12.00
L024	.14	14.50	.10	25.00	.37	32.00	.64	26.50	.91	28.50	.25	26.00
L025	.140	14.50	.085	13.10	.340	23.00	.635	24.00	.910	28.50	.250	26.00
L027	.15	20.00	.08	9.50	.34	23.00	.62	20.00	.86	22.50	.24	22.00
L029	.120	8.00	.075	6.00	.329	18.00	.599	7.00	.828	13.00	.211	9.00
L031	.16	25.00	.11	29.50	.33	20.00	.63	22.50	.85	19.50	.25	26.00
L032	.195 H	32.00	.132	32.00	.372	33.00	.647	29.00	.851	21.00	.269	30.00
L033	.2W	0.00	.2W	0.00	3.0 VH	36.00	.6	11.00	.8	5.00	2.0 VH	35.00
L045	.10	2.50	.06	3.00	.26	1.00	.53	2.00	.77	2.50	.18	2.00
L046	.14	14.50	.067	5.00	.32	15.00	.63	22.50	.83	14.50	.22	12.00
L048	.15	20.00	.11	29.50	.36	30.50	.57	4.50	.81	8.00	.24	22.00
L049	.17	29.00	.08	9.50	.36	30.50	.71	33.50	.92	30.00	.27	31.00
L057	.11	5.50		0.00	.28	3.00	.59	6.00	.81	8.00	.17 L	1.00
L058	.11	5.50	.08	9.50	.27	2.00	.60	11.00	.81	8.00	.21	7.00
L060	.13	10.50	.10	25.00	.35	28.00	.64	26.50	.89	25.00	.25	26.00
L061	.144	18.00	.091	20.00	.342	26.00		0.00		0.00		0.00
L062	.14	14.50	.08	9.50	.32	15.00	.61	17.00	.82	11.00	.23	17.00
L063	.17	29.00	.09	16.50	.31	11.50	.57	4.50	.8	5.00	.22	12.00
L064	.21 H	34.00	.12	31.00	.41 H	35.00	.74 H	35.00	1.0 H	34.00	.30 H	32.50
L066	.154	22.00	.093	21.00	.341	25.00	.608	15.00	.845	18.00	.236	20.00
MEDIAN CONC.	.144		.090		.330		.610		.845		.230	

PARAMETER: 19091 POTASSIUM MG/L

84/06/26

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.28	19.50	.49	13.00	2.39	10.50	.85	8.00
L003	.2 L	1.50	.4 L	1.50	2.4	15.00	.9	23.00
L004	.2 L	1.50	.4 L	1.50	2.2	2.50	.8	2.50
L006	.37 H	34.00	.56	33.00	3.50 VH	34.00	.94	28.50
L007	.30	29.50	.51	25.50	2.58	27.50	1.09 H	34.00
L009	.27	15.50	.50	20.00	2.4	15.00	.87	13.50
L010	.29	24.50	.52	28.00	2.40	15.00	.89	18.50
L011A	.26	11.50	.55	31.00	2.62	30.50	1.28 VH	35.00
L013	.27	15.50	.48	9.00	2.40	15.00	.92	26.00
L014	.30	29.50	.50	20.00	2.50	25.50	.90	23.00
L016	.25	7.50	.49	13.00	2.16	1.00	.83	5.00
L019	.271	15.50	.49	13.00	2.33	10.50	.86	10.50
L020A	.3	29.50	.5	20.00	2.4	15.00	.9	23.00
L020B	.30	29.50	.51	25.50	2.60	29.00	.97	31.00
L021	.24	6.00	.46	6.00	2.96 H	33.00	.81	4.00
L022	.27	15.50	.49	13.00	2.4	15.00	.84	6.00
L023	.23	4.00	.48	9.00	2.30	7.50	.88	15.50
L024	.29	24.50	.54	30.00	2.5	25.50	.93	27.00
L025	.285	22.00	.555	32.00	2.62	30.50	1.00	32.00
L027	.28	19.50	.50	20.00	2.45	21.00	.88	15.50
L029	.255	9.00	.474	7.00	2.37	9.00	.888	17.00
L031	.29	24.50	.51	25.50	2.48	24.00	.90	23.00
L032	.326	32.00	.528	29.00	2.23	4.00	.865	12.00
L033	3.0 VH	35.00	.5	20.00	2.3	7.50	.9	23.00
L045	.23	4.00	.44	3.50	2.27	6.00	.87	13.50
L046	.26	11.50	.50	20.00	2.53	27.50	.96	30.00
L048	.28	19.50	.50	20.00	2.25	5.00	.80	2.50
L049	.29	24.50	.59	34.00	2.66	32.00	1.07 H	33.00
L057	.23	4.00	.44	3.50	2.47	23.00	.85	8.00
L058	.25	7.50	.49	13.00	2.2	2.50	.89	18.50
L060	.28	19.50	.51	25.50	2.45	21.00	.94	28.50
L061		0.00		0.00		0.00		0.00
L062	.26	11.50	.48	9.00	2.42	19.00	.86	10.50
L063	.26	11.50	.45	5.00	2.4	15.00	.85	8.00
L064	.34	33.00	.62 H	35.00	3.7 VH	35.00	.71 L	1.00
L066	.294	27.00	.497	16.00	2.45	21.00	.894	20.00
MEDIAN CONC.	.280		.500		2.400		.890	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	161.50	16.150	10			
L003	74.50	7.450	10	LL	BIASED LOW	
L004	43.50	4.950	10	LL	BIASED LOW	19102
L006	327.50	32.750	10	VHVHVHHVH	BIASED HIGH	FLAME-AAS
L007	281.00	28.100	10	H		EMISSION
L009	157.50	15.750	10			
L010	240.50	24.050	10			FLAME ATOMIC-EMISS
L011A	239.00	23.900	10	VH		
L013	159.00	15.900	10			IC
L014	262.50	26.250	10	HVHH		AES
L016	52.50	5.250	10		BIASED LOW	AAS(E)
L019	164.00	16.400	10			IC
L020A	164.50	16.450	10			AUTO COL. FLAME
L020B	225.50	22.550	10			IC
L021	159.00	15.900	10	HH		IC
L022	151.00	15.100	10			
L023	95.50	9.550	10			FLAME AAS
L024	259.50	25.950	10			
L025	245.50	24.550	10			
L027	193.00	19.300	10			
L029	103.00	10.300	10			AAS
L031	239.50	23.950	10			
L032	254.00	25.400	10	H		
L033	172.50	21.563	8	VHVHVH		AUTO FLAME
L045	40.00	4.000	10		BIASED LOW	FLAME-AAS
L046	172.50	17.250	10			AA-AIR/C2H2
L048	161.50	16.150	10			IC
L049	287.00	28.700	10	H	BIASED HIGH	FLAME-AAS
L057	62.00	6.889	9	L	BIASED LOW	FLAME EMISS.
L058	84.50	8.450	10			FLAME AAS
L060	235.50	23.550	10			AAS
L061	64.00	21.333	3		INSUFFICIENT DATA	FLAME-AAS
L062	134.00	13.400	10			AAS
L063	118.00	11.800	10			AAS
L064	305.50	30.550	10	HHHHHHVHL	BIASED HIGH	FLAME AAS
L066	205.00	20.500	10			FLAME
OVERALL AVERAGE RANK IS		18.003				

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L045	40.00	4.000	10		BIASED LOW	FLAME-AAS
L004	49.50	4.950	10	LL	BIASED LOW	19102
L016	52.50	5.250	10		BIASED LOW	AAS(E)
L057	62.00	6.889	9	L	BIASED LOW	FLAME EMISS.
L003	74.50	7.450	10	LL	BIASED LOW	
L058	84.50	8.450	10			FLAME AAS
L023	95.50	9.550	10			FLAME AAS
L029	103.00	10.300	10			AAS
L063	118.00	11.800	10			AAS
L062	134.00	13.400	10			AAS
L022	151.00	15.100	10			
L009	157.50	15.750	10			IC
L013	159.00	15.900	10			IC
L021	159.00	15.900	10	HH		
L002	161.50	16.150	10			IC
L048	161.50	16.150	10			IC
L019	164.00	16.400	10			AUTO COL, FLAME
L020A	164.50	16.450	10			AA-AIR/C2H2
L046	172.50	17.250	10			
L027	193.00	19.300	10			FLAME
L066	205.00	20.500	10			FLAME-AAS
L061	64.00	21.333	3		INSUFFICIENT DATA	AUTO FLAME
L033	172.50	21.563	8	VHVHVH		IC
L020B	225.50	22.550	10			AAS
L060	235.50	23.550	10			
L011A	239.00	23.900	10	VH		FLAME ATOMIC-EMISS
L031	239.50	23.950	10			
L010	240.50	24.050	10			
L025	245.50	24.550	10			AES
L032	254.00	25.400	10	H		EMISSION
L024	259.50	25.950	10			
L014	262.50	26.250	10	HVHH		
L007	281.00	28.100	10	H		
L049	287.00	28.700	10	H		
L064	305.50	30.550	10	HHHHHHVHL	BIASED HIGH	FLAME-AAS
L006	327.50	32.750	10	VHVHVHHVH	BIASED HIGH	FLAME AAS
					BIASED HIGH	FLAME-AAS
OVERALL AVERAGE RANK IS		18.003				

PARAMETER: 17000 CHLORIDE IC MG/L

84/06/26

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.50 BASIC ACCEPTABLE ERROR= .25 CONCENTRATION ERROR INCREMENT= .15
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L006	1.17	18.00	.98	19.00	1.51	8.00	1.98	10.00	.616	17.00	.348	18.00
L007	.85	2.00	.80	9.00	1.46	3.50	1.90	5.00	.49	7.00	.25	6.50
L009	.73	1.00	.64	1.00	1.4	1.50	1.8	1.00	.41	1.00	.22	1.50
L011A	1.01	15.00	.85	16.00	1.49	5.00	2.18	18.00	.46	3.00	.22	1.50
L013	.90	8.00	.76	4.50	1.36	14.50	2.15	16.00	.48	6.00	.24	4.50
L014	1.0	13.50	.8	9.00	1.5	6.50	2.0	13.00	.6	15.50	.4	19.00
L019	.86	3.50	.74	2.50	1.56	14.50	1.82	2.00	.46	3.00	.23	3.00
L020A	.95	12.00	.85	16.00	1.66	18.00	2.16	17.00	.55	13.00	.27	11.00
L021	1.18	19.00	.96	18.00	1.95 VH	21.00	2.54 VH	20.00	.60	15.50	.27	11.00
L022	1.1	17.00	.8	9.00	1.6	17.00	1.90	5.00	.50	8.50	.30	14.00
L025	.89	6.50	.78	6.00	1.53	9.50	1.94	9.00	.52	10.50	.26	8.00
L028	2.2 VH	22.00	2.18 VH	22.00	2.86 VH	22.00	3.44 VH	21.00	2.32 VH	21.00	2.00 VH	21.00
L029	.935	11.00	.806	12.00	1.55	12.50	2.12	15.00	.617	18.00	.320	17.00
L032	.91	9.00	1.02	20.00	1.53	9.50	1.90	5.00	.73	19.00	.27	11.00
L048	1.20 H	20.00	1.06 H	21.00	1.67	19.00	2.01	14.00	.86 H	20.00	.67 VH	20.00
L050	.86	3.50	.74	2.50	1.46	3.50	1.97	9.00	.47	5.00	.25	6.50
L058	.87	5.00	.84	14.00	1.54	11.00	1.90	5.00	.52	10.50	.30	14.00
L061	.93	10.00	.76	4.50	1.57	16.00		0.00		0.00		0.00
L062	1.0	13.50	.8	9.00	1.5	6.50	1.9	5.00	.5	8.50	.3	14.00
L063	1.34 VH	21.00	.80	9.00	1.55	12.50	1.99	11.50	.53	12.00	.31	16.00
L064	.89	6.50	.85	16.00	1.4	1.50	2.2	19.00	.46	3.00	.24	4.50
L066	1.02	16.00	.816	13.00	1.78	20.00	1.99	11.50	.551	14.00	.267	9.00
MEDIAN CONC.	.943		.803		1.545		1.990		.520		.270	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L006	.379	19.00	1.28	10.00	6.7	9.50	99.7	3.00
L007	.23	5.00	1.19	4.50	6.7	9.50	104.	6.00
L009	.24	7.50	1.1	2.00	5.3 L	1.00		0.00
L011A	.31	16.00	1.17	3.00	5.50 L	2.00	114.	16.00
L013	.22	3.00	1.23	9.00	6.83	13.00	105.2	9.00
L014	.3	14.50	1.3	12.50	12.2 VH	21.00	104.	6.00
L019	.23	5.00	.97 L	1.00	6.24	4.00	104.	6.00
L020A	.25	10.00	1.29	11.00	6.84	14.00	110.5	15.00
L021	.25	10.00	1.46	19.00	7.20	18.00	140.4 VH	19.00
L022	.30	14.50	1.20	7.00	8.5 VH	20.00	110.	13.50
L025	.25	10.00	1.31	14.00	6.80	11.50	49.0 VL	1.00
L028	1.93 VH	21.00	3.06 VH	21.00	8.04 H	19.00		0.00
L029	.203	2.00	1.32	16.00	6.91	16.00	106.	10.50
L032	.26	12.00	1.32	16.00	6.86	15.00	106.0	10.50
L048	.64 VH	20.00	1.44	18.00	6.37	6.00	96.	2.00
L050	.24	7.50	1.30	12.50	6.80	11.50	102.9	4.00
L058	.27	13.00	1.32	16.00	6.4	7.00	118.	17.00
L061		0.00		0.00		0.00		0.00
L062	.2	1.00	1.2	7.00	6.6	8.00	110.	13.50
L063	.35	18.00	1.19	4.50	6.3	5.00	105.	8.00
L064	.23	5.00	1.2	7.00	6.0	3.00	124. H	18.00
L066	.343	17.00	1.47	20.00	7.04	17.00	107.	12.00
MEDIAN CONC.	.250		1.290		6.800		106.000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L006	131.50	13.150	10			DIONEX IC
L007	58.00	5.800	10			
L009	17.50	1.944	9	L		
L011A	95.50	9.550	10	L	BIASED LOW	
L013	87.50	8.750	10			IC
L014	130.50	13.050	10	VH		IC
L019	44.50	4.450	10	L	BIASED LOW	IC
L020A	137.00	13.700	10			IC
L021	170.50	17.050	10	VHVHVH		IC
L022	125.50	12.550	10	VH		
L025	85.00	8.500	10	VL		
L028	190.00	21.111	9	VHVHVHVHVHVHVHVHH	BIASED HIGH	WESCAN-SCIC
L029	130.00	13.000	10			IC
L032	127.00	12.700	10			
L048	160.00	16.000	10	HHHVHVH		IC
L050	65.50	6.550	10			IC
L058	112.50	11.250	10			IC
L061	30.50	10.167	3		INSUFFICIENT DATA	IC
L062	86.00	8.600	10			IC
L063	117.50	11.750	10	VH		IC
L064	83.50	8.350	10	H		IC
L066	149.50	14.950	10			IC (DIONEX 10)
						IC
OVERALL AVERAGE RANK IS		11.066				

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L009	17.50	1.944	9	L		
L019	44.50	4.450	10	L	BIASED LOW	
L007	58.00	5.800	10		BIASED LOW	IC
L050	65.50	6.550	10			
L064	83.50	8.350	10	H		IC
L025	85.00	8.500	10	VL		IC (DIONEX 10)
L062	86.00	8.600	10			
L013	87.50	8.750	10			IC
L011A	95.50	9.550	10	L		IC
L061	30.50	10.167	3		INSUFFICIENT DATA	
L058	112.50	11.250	10			IC
L063	117.50	11.750	10	VH		IC
L022	125.50	12.550	10	VH		IC
L032	127.00	12.700	10			
L029	130.00	13.000	10			
L014	130.50	13.050	10	VH		IC
L006	131.50	13.150	10			IC
L020A	137.00	13.700	10			DIONEX IC
L066	149.50	14.950	10			IC
L048	160.00	16.000	10	HHHVHVH		IC
L021	170.50	17.050	10	VHVHVH		IC
L028	190.00	21.111	9	VHVHVHVHVHVHVHVHH	BIASED HIGH	WESCAN-SCIC
OVERALL AVERAGE RANK IS		11.066				

CHLORIDE IC

PARAMETER: 17001 CHLORIDE NON IC METHODS MG/L

84/06/26

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.50 BASIC ACCEPTABLE ERROR= .25 CONCENTRATION ERROR INCREMENT= .15
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.8	4.00	.7	6.50	1.5	11.50	2.3	19.50	.7	17.00	.4	17.50
L003	.9	12.00	.9	13.50	1.6	18.00	2.2	17.00	.6	11.00	.3T	9.50
L004	.9	12.00	.8	13.50	1.6	18.00	2.3	19.50	.6	11.00	.3	9.50
L006B	.815	7.00	.905	20.00	1.40	4.50	2.08	10.00	.624	15.00	.326	15.00
L009B	.80	4.00	.68	4.00	1.5	11.50	2.0	6.50	.56	8.00	.32	13.50
L010	.8	4.00	.6	1.00	1.3	2.00	1.9	1.50	.5	4.50	.2T	2.50
L011C	.95	16.00	.80	13.50	1.50	11.50	2.17	15.00	.61	14.00	.32	13.50
L016	.72	1.00	.64	2.00	1.25	1.00	2.10	12.50	.50	4.50	.23	5.00
L020C	.9	12.00	.8	13.50	1.5	11.50	2.1	12.50	.7	17.00	.4T	17.50
L023	.90	12.00	.70	6.50	1.5	11.50	2.0	6.50	.50	4.50	.30	9.50
L024	.92	15.00	.79	10.00	1.5	11.50	2.1	12.50	.53	7.00	.24	6.00
L027	.87	9.00	.71	9.00	1.48	6.00	1.97	3.00	.48	2.00	.22	4.00
L031	.9	12.00	.8	13.50	1.5	11.50	2.1	12.50	.6	11.00	.4	17.50
L033	1.W	0.00	1.W	0.00	2. VH	21.00	2.	6.50	5. VH	20.00	1.W	0.00
L045	.82	8.00	.66	3.00	1.35	3.00	1.90	1.50	.39	1.00	.15	1.00
L046	.8	4.00	.7	6.50	1.5	11.50	2.2	17.00	.6	11.00	.3	9.50
L048	1.0	17.50	.9	18.50	1.5	11.50	2.0	6.50	.7	17.00	.3	9.50
L049	.8	4.00	.7	6.50	1.5	11.50	2.0	6.50	.5	4.50	.2	2.50
L061B	1.00	17.50	.83	17.00	1.66	20.00		0.00		0.00		0.00
L062B	1.1	19.00	.9	18.50	1.6	18.00	2.2	17.00	.8	19.00	.4	17.50
L063B	1.20 H	20.00	.80	13.50	1.4	4.50	2.0	6.50	.6	11.00	.3	9.50
MEDIAN CONC.	.900		.795		1.500		2.090		.600		.300	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.3	14.50	1.2	8.50	7.25	19.00	100.89	7.00
L003	.2T	5.50	1.4	19.50	7.2	18.00	116.	19.00
L004	.3	14.50	1.3	15.00	7.4	20.00	39.0 VL	1.00
L006B	.307	17.00	1.19	6.00	5.79 L	1.00	97.1	3.00
L009B	.27	11.00	1.3	15.00	6.9	10.50		0.00
L010	.2T	5.50	1.2	8.50	6.6	5.00	105.	11.00
L011C	.28	12.00	1.24	11.00	6.92	13.00	105.	11.00
L016	.20	5.50	1.15	4.00	6.00	2.00	98.00	4.50
L020C	.4T	18.00	1.3	15.00	6.9	10.50	104.5	9.00
L023	.20	5.50	1.1	2.50	6.7	6.00	98.	4.50
L024	.21	10.00	1.3	15.00	6.9	10.50	105.	11.00
L027	.20	5.50	1.18	5.00	6.87	8.00	106.7	14.00
L031	.2	5.50	1.3	15.00	7.	15.50	108.	15.00
L033	1.W	0.00	1.W	1.00	7.	15.50	106.	13.00
L045	.17	1.00	1.16	2.50	6.51	4.00	102.	8.00
L046	.2	5.50	1.3	15.00	7.0	15.50	110.	17.00
L048		0.00	1.3	15.00	6.9	7.00	95.	2.00
L049	.2	5.50	1.2	8.50	6.4	3.00	100.	6.00
L061B		0.00		0.00		0.00		0.00
L062B	.3	14.50	1.4	19.50	7.0	15.50	110.	17.00
L063B	.3	14.50	1.2	8.50	6.9	10.50	110.	17.00
MEDIAN CONC.	.205		1.220		6.900		105.000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	125.00	12.500	10			
L003	143.00	14.300	10			SPEC. ION EL.
L004	134.00	13.400	10	VL		17203
L006B	98.50	9.850	10	L		AUTOANALYZER
L009B	84.00	9.333	9			
L010	45.50	4.550	10		BIASED LOW	THIOCYANATE CONB.R
L011C	130.50	13.050	10			
L016	42.00	4.200	10		BIASED LOW	THIOCYAUATE
L020C	136.50	13.650	10			AUTO COL MER. TM.
L023	69.00	6.900	10			AUTO. THIOCYANATE
L024	108.50	10.850	10			
L027	55.50	6.550	10			
L031	129.00	12.900	10			
L033	77.00	12.833	6	VHVH		AUTO SCN
L045	33.00	3.300	10		BIASED LOW	MERCURIC THIOCYANA
L046	112.50	11.250	10			AUTOANALYSER
L048	104.50	11.611	9			TECHNICON
L049	58.50	5.850	10			AUTOANALYSER
L061B	54.50	18.167	3		INSUFFICIENT DATA	TECHNICON AAII
L062B	175.50	17.550	10		BIASED HIGH	COLORIMETRIC AUTOM
L063B	115.50	11.550	10	H		FESCN DISCR

OVERALL AVERAGE RANK IS 10.365

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L045	33.00	3.300	10		BIASED LOW	MERCURIC THIOCYANA
L016	42.00	4.200	10		BIASED LOW	THIOCYAUATE
L010	45.50	4.550	10		BIASED LOW	THIOCYANATE CONB.R
L049	58.50	5.850	10			AUTOANALYSER
L027	65.50	6.550	10			
L023	69.00	6.900	10			AUTO. THIOCYANATE
L009B	84.00	9.333	9			
L006B	98.50	9.850	10	L		AUTOANALYZER
L024	108.50	10.850	10			
L046	112.50	11.250	10			AUTOANALYSER
L063B	115.50	11.550	10	H		FESCN DISCR
L048	104.50	11.611	9			TECHNICON
L002	125.00	12.500	10			
L033	77.00	12.833	6	VHVH		AUTO SCN
L031	129.00	12.900	10			
L011C	130.50	13.050	10			
L004	134.00	13.400	10	VL		17203
L020C	136.50	13.650	10			AUTO COL MER. TM.
L003	143.00	14.300	10			SPEC. ION EL.
L062B	175.50	17.550	10		BIASED HIGH	COLORIMETRIC AUTOM
L061B	54.50	18.167	3		INSUFFICIENT DATA	TECHNICON AAII

OVERALL AVERAGE RANK IS 10.365

PARAMETER: 17092 CHLORIDE (ALL METHODS) MG/L

84/06/26

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.50 BASIC ACCEPTABLE ERROR= .25 CONCENTRATION ERROR INCREMENT= .15
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.8	5.00	.7	7.50	1.5	17.00	2.3	37.50	.7	34.50	.4	35.00
L003	.9	19.50	.8	22.00	1.6	34.50	2.2	34.50	.6	26.00	.3T	22.50
L004	.9	19.50	.8	22.00	1.6	34.50	2.3	37.50	.6	26.00	.3	22.50
L006	1.17 H	37.00	.98	38.50	1.51	23.00	1.98	13.00	.616	31.00	.348	32.00
L006B	.815	8.00	.905	36.00	1.43	5.50	2.08	23.00	.624	33.00	.326	31.00
L007	.85	10.00	.80	22.00	1.46	8.50	1.90	6.00	.49	9.00	.25	12.50
L009	.73	2.00	.64	2.50	1.4	5.50	1.8	1.00	.41	2.00	.22	5.00
L009B	.80	5.00	.69	5.00	1.5	17.00	2.0	18.50	.56	22.00	.32	29.00
L010	.8	5.00	.6	1.00	1.3	2.00	1.9	6.00	.5	12.50	.2T	2.50
L011A	1.01	32.00	.85	33.00	1.43	11.00	2.18	32.00	.46	4.00	.22	5.00
L011C	.95	27.50	.80	22.00	1.50	17.00	2.17	31.00	.61	30.00	.32	29.00
L013	.90	19.50	.76	13.50	1.56	29.50	2.15	29.00	.48	7.50	.24	10.00
L014	1.0	30.00	.8	22.00	1.5	17.00	2.0	18.50	.6	26.00	.4	35.00
L016	.72	1.00	.64	2.50	1.25	1.00	2.10	25.50	.50	12.50	.23	7.50
L019	.86	11.50	.74	11.50	1.56	29.50	1.82	2.00	.46	4.00	.23	7.50
L020A	.95	27.50	.85	33.00	1.66	37.50	2.16	30.00	.55	20.00	.27	17.00
L020C	.9	19.50	.8	22.00	1.5	17.00	2.1	25.50	.7	34.50	.4T	35.00
L021	1.18 H	38.00	.96	37.00	1.95 VH	40.00	2.54 VH	39.00	.60	26.00	.27	17.00
L022	1.1	35.00	.8	22.00	1.6	34.50	1.90	6.00	.50	12.50	.30	22.50
L023	.90	19.50	.70	7.50	1.5	17.00	2.0	18.50	.50	12.50	.30	22.50
L024	.92	24.00	.79	16.00	1.5	17.00	2.1	25.50	.53	18.50	.24	10.00
L025	.89	15.50	.78	15.00	1.53	24.50	1.94	10.00	.52	16.50	.26	14.00
L027	.87	13.50	.71	10.00	1.48	10.00	1.97	11.50	.48	7.50	.22	5.00
L028	2.2 VH	41.00	2.18 VH	41.00	2.86 VH	42.00	3.44 VH	40.00	2.32 VH	39.00	2.00 VH	39.00
L029	.935	26.00	.806	28.00	1.55	27.50	2.12	28.00	.617	32.00	.320	29.00
L031	.9	19.50	.9	22.00	1.5	17.00	2.1	25.50	.6	26.00	.4	35.00
L032	.91	23.00	1.02	40.00	1.53	24.50	1.90	6.00	.73	36.00	.27	17.00
L033	1.H	0.00	1.H	0.00	2. VH	41.00	2.	18.50	5. VH	40.00	1.H	0.00
L045	.82	9.00	.66	4.00	1.35	3.00	1.90	6.00	.39	1.00	.15	1.00
L046	.8	5.00	.7	7.50	1.5	17.00	2.2	34.50	.6	26.00	.3	22.50
L048	1.100	35.00	.980	38.50	1.585	32.00	2.005	22.00	.780	37.00	.485	38.00
L049	.8	5.00	.7	7.50	1.5	17.00	2.0	18.50	.5	12.50	.2	2.50
L050	.86	11.50	.74	11.50	1.46	8.50	1.97	11.50	.47	6.00	.25	12.50
L058	.87	13.50	.84	31.00	1.54	26.00	1.93	6.00	.52	16.50	.30	22.50
L061	.93	25.00	.76	13.50	1.57	31.00		0.00		0.00		0.00
L061B	1.00	30.00	.83	30.00	1.66	37.50		0.00		0.00		0.00
L062	1.0	30.00	.8	22.00	1.5	17.00	1.9	6.00	.5	12.50	.3	22.50
L062B	1.1	35.00	.9	35.00	1.6	34.50	2.2	34.50	.8	38.00	.4	35.00
L063	1.34 VH	40.00	.80	22.00	1.55	27.50	1.99	14.50	.53	18.50	.31	27.00
L063B	1.20 H	39.00	.80	22.00	1.4	5.50	2.0	18.50	.6	26.00	.3	22.50
L064	.89	15.50	.85	33.00	1.4	5.50	2.2	34.50	.46	4.00	.24	10.00
L066	1.02	33.00	.816	29.00	1.78 H	39.00	1.99	14.50	.551	21.00	.267	15.00
MEDIAN CONC.	.900		.800		1.500		2.000		.551		.300	

PARAMETER: 17092 CHLORIDE (ALL METHODS) MG/L 84/06/26

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.3	28.50	1.2	14.00	7.25	36.00	100.89	9.00
L003	.2T	6.00	1.4	35.50	7.2	34.50	116.	34.00
L004	.3	28.50	1.3	25.50	7.4	37.00	39.0 VL	1.00
L006	.379	36.00	1.28	20.00	6.7	15.00	99.7	7.00
L006B	.307	32.00	1.19	9.00	5.73 L	3.00	97.1	4.00
L007	.23	15.00	1.19	9.00	6.7	15.00	104.	13.00
L009	.24	17.50	1.1	3.00	5.3 L	1.00		0.00
L009B	.27	23.50	1.3	25.50	6.9	24.50		0.00
L010	.2T	6.00	1.2	14.00	6.6	12.50	105.	17.50
L011A	.31	33.00	1.17	6.00	5.50 L	2.00	114.	33.00
L011C	.28	25.00	1.24	19.00	6.92	28.00	105.	17.50
L013	.22	13.00	1.23	18.00	6.83	19.00	105.2	20.00
L014	.3	28.50	1.3	25.50	12.2 VH	40.00	104.	13.00
L016	.20	6.00	1.15	5.00	6.00	4.50	98.00	5.50
L019	.23	15.00	.97 L	1.00	6.24	6.00	104.	13.00
L020A	.25	20.00	1.29	21.00	6.84	20.00	110.5	32.00
L020C	.4T	37.00	1.3	25.50	6.9	24.50	104.5	15.00
L021	.25	20.00	1.46	37.00	7.20	34.50	140.4 VH	37.00
L022	.30	28.50	1.20	14.00	8.5 VH	39.00	110.	29.00
L023	.20	6.00	1.1	3.00	6.7	15.00	98.	5.50
L024	.21	12.00	1.3	25.50	6.9	24.50	105.	17.50
L025	.25	20.00	1.31	30.00	6.80	17.50	49.0 VL	2.00
L027	.20	6.00	1.18	7.00	6.87	22.00	106.7	24.00
L028	1.93 VH	39.00	3.06 VH	39.00	8.04 H	38.00		0.00
L029	.203	11.00	1.32	32.00	6.91	27.00	106.	22.00
L031	.2	6.00	1.3	25.50	7.	30.50	108.	26.00
L032	.26	22.00	1.32	32.00	6.86	21.00	106.0	22.00
L033	1.W	0.00	1.W	0.00	7.	30.50	106.	22.00
L045	.17	1.00	1.10	3.00	6.50	10.00	102.	10.00
L046	.2	6.00	1.3	25.50	7.0	30.50	110.	29.00
L048	.64 VH	38.00	1.370	34.00	6.585	11.00	95.5	3.00
L049	.2	6.00	1.2	14.00	6.4	8.50	100.	8.00
L050	.24	17.50	1.30	25.50	6.80	17.50	102.9	11.00
L058	.27	23.50	1.32	32.00	6.4	8.50	118.	35.00
L061		0.00		0.00		0.00		0.00
L061B		0.00		0.00		0.00		0.00
L062	.2	6.00	1.2	14.00	6.6	12.50	110.	29.00
L062B	.3	28.50	1.4	35.50	7.0	30.50	110.	29.00
L063	.35	35.00	1.19	9.00	6.3	7.00	105.	17.50
L063B	.3	28.50	1.2	14.00	6.9	24.50	110.	29.00
L064	.23	15.00	1.2	14.00	6.0	4.50	124. H	36.00
L066	.343	34.00	1.47	38.00	7.04	33.00	107.	25.00
MEDIAN CONC.	.250		1.280		6.850		105.000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	224.00	22.400	10			
L003	269.00	26.900	10			
L004	254.00	25.400	10	VL		SPEC. ION EL.
L006	252.50	25.250	10	H		17203
L006B	184.50	18.450	10	L		DIONEX IC
L007	120.00	12.000	10			AUTOANALYZER
L009	39.50	4.389	9	L		
L009B	170.00	18.889	9		BIASED LOW	
L010	79.00	7.900	10			
L011A	191.00	19.100	10	L	BIASED LOW	THIOCYANATE GONB.R
L011C	246.00	24.600	10			
L013	179.00	17.900	10			
L014	255.50	25.550	10	VH		IC
L016	71.00	7.100	10			IC
L019	101.00	10.100	10	L	BIASED LOW	THIOCYAUATE
L020A	259.00	25.800	10			IC
L020C	255.50	25.550	10			IC
L021	325.50	32.550	10	HVHVHVH		AUTO COL MER. TM.
L022	243.00	24.300	10	VH		IC
L023	127.00	12.700	10			
L024	190.50	19.050	10			AUTO. THIOCYANATE
L025	165.00	16.500	10	VL		
L027	116.50	11.650	10			
L028	358.00	39.778	9	VHVHVHVHVHVHVHVHH		
L029	262.50	26.250	10		BIASED HIGH	WESCAN-SCIC
L031	233.00	23.300	10			IC
L032	243.50	24.350	10			
L033	152.00	30.400	5	VHVH		
L045	48.00	4.800	10			AUTO SCN
L046	203.50	20.350	10		BIASED LOW	MERCURIC THIOCYANA
L048	288.50	28.850	10	VH		AUTOANALYSER
L049	99.50	9.950	10			IC
L050	133.00	13.300	10			AUTOANALYSER
L058	214.50	21.450	10			IC
L061	69.50	23.167	3			IC
L061B	97.50	32.500	3		INSUFFICIENT DATA	IC
L062	171.50	17.150	10		INSUFFICIENT DATA	TECHNICON AAII
L062B	335.50	33.550	10			IC
L063	218.00	21.800	10	VH	BIASED HIGH	COLORIMETRIC AUTOM
L063B	229.50	22.950	10	H		IC
L064	172.00	17.200	10	H		FESCN DISCR
L066	281.50	28.150	10	H		IC (DIONEX 10)
						IC
OVERALL AVERAGE RANK IS		20.422				

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LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L009	33.50	4.389	9	L	BIASED LOW	
L045	48.00	4.800	10		BIASED LOW	MERCURIC THIOCYANA
L016	71.00	7.100	10		BIASED LOW	THIOCYAUATE
L010	79.00	7.900	10		BIASED LOW	THIOCYANATE CONB.R
L049	99.50	9.950	10			AUTOANALYSER
L019	101.00	10.100	10	L		IC
L027	116.50	11.650	10			
L007	120.00	12.000	10			
L023	127.00	12.700	10			AUTO. THIOCYANATE
L050	133.00	13.300	10			IC
L025	165.00	16.500	10	VL		
L062	171.50	17.150	10			IC
L064	172.00	17.200	10	H		IC (DIONEX 10)
L013	179.00	17.900	10			IC
L006B	184.50	18.450	10	L		AUTOANALYZER
L009B	170.00	18.889	9			
L024	190.50	19.050	10			
L011A	191.00	19.100	10	L		
L046	203.50	20.350	10			AUTOANALYSER
L058	214.50	21.450	10			IC
L063	218.00	21.800	10	VH		IC
L002	224.00	22.400	10			
L063B	229.50	22.950	10	H		FESCN DISCR
L061	69.50	23.167	3		INSUFFICIENT DATA	IC
L031	233.00	23.300	10			
L022	243.00	24.300	10	VH		
L032	243.50	24.350	10			
L011C	246.00	24.600	10			
L006	252.50	25.250	10	H		
L004	254.00	25.400	10	VL		DIONEX IC
L020C	255.50	25.550	10			17203
L014	255.50	25.550	10	VH		AUTO COL MER. TH.
L020A	258.00	25.800	10			IC
L029	262.50	26.250	10			IC
L003	269.00	26.900	10			IC
L066	281.50	28.150	10	H		SPEC. ION EL.
L048	288.50	28.850	10	VH		IC
L033	152.00	30.400	5	VHVH		IC
L061B	97.50	32.500	3			AUTO SCN
L021	325.50	32.550	10	HVHVHVH	INSUFFICIENT DATA	TECHNICON AAII
L062B	335.50	33.550	10			IC
L028	358.00	39.778	9	VHVHVHVHVHVHVHVHH	BIASED HIGH	COLORIMETRIC AUTON
					BIASED HIGH	WESCAN-SCIC
OVERALL AVERAGE RANK IS		20.422				

PARAMETER: 16000 SULFATE,IC METHOD MG/L

84/06/26

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.00 BASIC ACCEPTABLE ERROR= .76 CONCENTRATION ERROR INCREMENT= .20
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L003	7.0 H	27.00	7.2 H	27.00	.6	19.50	9.0	11.00	5.3	17.50	6.5	18.50
L006	5.28	9.00	4.69	1.00	.14	2.00	9.38	18.00	5.06	6.00	6.36	13.00
L007	5.2	5.50	5.3	12.50	.13	1.00	9.0	11.00	4.3	2.00	5.9	2.00
L009	5.2	5.50	5.2	4.00	.31	10.50	8.3	2.00	5.2	12.50	6.3	7.50
L011A	5.53	18.00	5.55	25.00	.50W	0.00	9.85	23.00	5.59	23.00	6.67	21.00
L013	5.23	7.50	5.19	6.00	.30	7.00	8.88	6.50	5.18	11.00	6.18	4.00
L014	5.6	19.50	5.4	17.00	.9	24.00	9.0	11.00	5.1	7.50	6.1	3.00
L019	5.15	4.00	5.17	4.50	.43	16.50	8.78	5.00	5.10	7.50	6.23	5.00
L020A	5.65	22.00	5.60	24.00	.31	10.50	10.16	25.00	6.00	26.00	6.92	24.00
L021	5.23	7.50	5.17	4.50	.30	7.00	9.39	19.00	5.05	5.00	6.33	10.50
L022	5.4	14.50	5.4	17.00	.7	22.00	8.9	8.50	5.3	17.50	6.4	14.00
L024	5.35	12.50	5.37	14.50	.45	18.00	8.88	6.50	5.26	16.00	6.33	10.50
L025	5.35	12.50	5.45	22.00	.30	7.00	9.05	14.00	5.35	20.00	6.50	18.50
L027	5.08	2.00	5.06	3.00	.35	13.50	8.48	3.00	5.16	9.50	5.81	1.00
L028	5.82	24.00	5.41	19.00	1.52 VH	25.00	10.03	24.00	5.99	25.00	7.36	25.00
L029	5.68	23.00	5.20	8.00	.5W	0.00	9.12	15.00	4.85	3.00	6.45	16.00
L032	5.31	11.00	5.25	10.50	.35	13.50	9.02	13.00	5.16	9.50	6.34	12.00
L048	5.3	10.00	5.3	12.50	.80	23.00	8.90	8.50	5.24	15.00	6.32	9.00
L050	4.97	1.00	4.96	2.00	.25	3.00	8.67	4.00	4.98	4.00	6.25	6.00
L057	5.60	19.50	5.37	14.50	.37	15.00	9.49	21.00	5.55	22.00	6.57	20.00
L058	5.1	3.00	5.2	8.00	.5	19.50	8.2	1.00	5.2	12.50	6.3	7.50
L060	5.40	14.50	5.25	10.50	.30	7.00	9.22	16.00	5.22	14.00	6.44	15.00
L061	5.43	16.00	5.43	20.50	.43	16.50		0.00		0.00		0.00
L062	5.5	17.00	5.4	17.00	.3	7.00	9.5	22.00	5.6	24.00	6.7	22.00
L063	6.19	26.00	5.43	20.50	.33	12.00	9.45	20.00	5.32	19.00	6.48	17.00
L064	6.0	25.00	5.9	26.00	.29	4.00	11.	26.00	4.5	1.00	7.8	26.00
L066	5.61	21.00	5.47	23.00	.574	21.00	9.28	17.00	5.50	21.00	6.78	23.00
MEDIAN CONC.	5.400		5.370		.350		9.035		5.210		6.380	

PARAMETER: 16000 SULFATE,IC METHOD MG/L 84/06/26

SAMPLE LAB NO	7 REPORTED VALUE	7 RANK	8 REPORTED VALUE	8 RANK	9 REPORTED VALUE	9 RANK	10 REPORTED VALUE	10 RANK
L003	5.0	11.00	3.5	22.50	19.8	19.50	36.0	3.50
L006	5.16	14.00	2.95	3.00	16.5	3.00	36.9	10.00
L007	4.8	2.00	3.0	4.00	15.8	8.50	36.4	5.50
L009	5.0	11.00	3.3	16.50	11.6 VL	1.00	34.8 VL	1.00
L011A	5.36	23.50	3.0	5.00	18.6	6.00	37.9	15.00
L013	4.85	5.00	3.08	6.00	19.3	14.50	37.3	12.00
L014	5.0	11.00	3.1	7.00	20.2	23.50	36.4	5.50
L019	4.88	6.00	3.15	8.00	19.3	14.50	37.2	11.00
L020A	5.41	25.00	3.39	20.00	19.47	17.00	39.4	21.50
L021	5.14	17.00	3.25	12.00	18.80	8.50	37.91	16.00
L022	5.1	15.50	3.3	16.50	21.	26.00	40.	24.00
L024	5.06	13.00	3.23	9.50	18.95	11.00	37.38	13.00
L025	5.20	20.00	3.40	21.00	19.0	12.00	36.5	8.00
L027	4.82	3.00	2.85	1.00	19.95	21.00	38.20	17.00
L028	6.15	26.00	4.59 H	26.00	20.2	23.50	40.5	25.00
L029	4.99	9.00	3.26	13.50	19.6	18.00	38.6	18.50
L032	4.95	7.50	3.26	13.50	18.67	7.00	36.79	9.00
L048	5.07	14.00	3.54	24.00	19.8	19.50	38.6	18.50
L050	4.95	7.50	3.31	19.00	18.85	10.00	36.48	7.00
L057	4.83	4.00	3.30	16.50	18.5	5.00	39.5	23.00
L058	5.3	21.50	3.5	22.50	17.8	4.00	45.	26.00
L060	5.10	15.50	3.245	11.00	19.4	16.00	37.5	14.00
L061		0.00		0.00		0.00		0.00
L062	5.3	21.50	3.3	16.50	20.	22.00	39.	20.00
L063	5.17	19.00	3.23	9.50	19.1	13.00	36.	3.50
L064	4.6	1.00	2.9	2.00	16.	2.00	32.	2.00
L066	5.36	23.50	3.79	25.00	20.9	25.00	39.4	21.50
MEDIAN CONC.	5.065		3.260		19.200		37.440	

LAB NC.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING
L003	177.00	17.700	10	HH
L006	83.00	8.300	10	
L007	54.00	5.400	10	
L009	75.50	7.550	10	VLVL
L011A	159.50	17.722	9	
L013	79.50	7.950	10	
L014	129.00	12.900	10	
L019	82.00	8.200	10	
L020A	215.00	21.500	10	
L021	107.00	10.700	10	
L022	175.50	17.550	10	
L024	124.50	12.450	10	
L025	155.00	15.500	10	
L027	74.00	7.400	10	
L028	242.50	24.250	10	
L029	124.00	13.778	9	VHH
L032	106.50	10.650	10	
L048	154.00	15.400	10	
L050	63.50	6.350	10	
L057	160.50	16.050	10	
L058	125.50	12.550	10	
L060	133.50	13.350	10	
L061	53.00	17.667	3	
L062	139.00	13.900	10	
L063	159.50	15.950	10	
L064	115.00	11.500	10	
L066	221.00	22.100	10	

OVERALL AVERAGE RANK IS 13.556

	METHOD CODING
	DIONEX
	DIONEX-IC
BIASED LOW	
	IC
	IC
	IC
BIASED HIGH	IC
	IC
BIASED HIGH	MESSAN-SCIC
	IC
	IC
BIASED LOW	IC
	IC
	IC
INSUFFICIENT DATA	IC
	IC
	IC
	IC
BIASED HIGH	IC (DIONEX 10)
	IC

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L007	54.00	5.400	10		BIASED LOW	
L050	63.50	6.350	10		BIASED LOW	IC
L027	74.00	7.400	10			
L009	75.50	7.550	10	VLVL		
L013	79.50	7.950	10			IC
L019	82.00	8.200	10			IC
L006	83.00	8.300	10			DIONEX-IC
L032	106.50	10.650	10			
L021	107.00	10.700	10			IC
L064	115.00	11.500	10			IC (DIONEX 10)
L024	124.50	12.450	10			
L058	125.50	12.550	10			IC
L014	129.00	12.900	10			IC
L060	133.50	13.350	10			IC
L029	124.00	13.778	9			IC
L048	154.00	15.400	10			IC
L025	155.00	15.500	10			
L063	159.50	15.950	10			IC
L057	160.50	16.050	10			IC
L022	175.50	17.550	10			
L061	53.00	17.667	3		INSUFFICIENT DATA	IC
L003	177.00	17.700	10	HH		DIONEX
L011A	159.50	17.722	9			
L062	193.00	18.900	10			IC
L020A	215.00	21.500	10		BIASED HIGH	IC
L066	221.00	22.100	10		BIASED HIGH	IC
L028	242.50	24.250	10	VHH	BIASED HIGH	MESSAN-SCIC
OVERALL AVERAGE RANK IS		13.556				

SULFATE, IC METHOD

PARAMETER: 16001 SULFATE NON IC METHODS MG/L

84/06/26

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.00 BASIC ACCEPTABLE ERROR= .76 CONCENTRATION ERROR INCREMENT= .20
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	5.3	11.50	5.4	13.50	.3	5.50	9.3	8.00	5.07	4.00	6.39	7.00
L003B	5.0	4.50	5.0	4.50	.5	14.50	9.0	6.50	5.2	6.00	6.2	5.00
L004	5.2	8.50	5.2	9.50	.1	2.00	10.7	16.00	6.0	16.50	6.7	15.00
L006B	4.62	1.00	4.42	2.00	.118	3.00	8.06	1.00	4.38	1.00	5.29	1.00
L010	5.4	14.50	5.1	7.50	1.0	16.00	9.4	9.00	5.8	13.50	6.5	9.00
L011B	5.34	13.00	5.66	17.00	.33T	7.00	9.45	10.00	5.43	9.00	6.59	10.00
L016	5.47	16.00	5.63	16.00	.43	13.00	10.33	15.00	5.29	7.00	6.60	12.50
L020B	5.2	8.50	5.3	12.00	.5T	14.50	9.7	12.50	5.7	11.50	6.6	12.50
L023	5.1	6.50	5.1	7.50	.4	10.00	8.6	2.00	5.0	2.50	6.3	6.00
L031	5.3	11.50	5.4	13.50	.4	10.00	8.8	4.50	5.0	2.50	6.0	3.00
L033	6.	17.00	6.	18.00	5.H	0.00	9.	6.50	6.	16.50	7.	17.00
L045	4.9	3.00	4.4	1.00	.1W	1.00	8.7	3.00	5.1	5.00	5.9	2.00
L046	5.0	4.50	5.0	4.50	.4	10.00	8.8	4.50	5.3	8.00	6.1	4.00
L048	5.1	6.50	5.2	9.50	.3	5.50	10.0	14.00	5.8	13.50	6.8	16.00
L049	4.8	2.00	5.0	4.50	1.6 VH	17.00	10.8	17.00	5.9	15.00	6.6	12.50
L061B	5.28	10.00	5.29	11.00	.41	12.00		0.00		0.00		0.00
L062B	5.4	14.50	5.0	4.50	.2	4.00	9.7	12.50	5.7	11.50	6.6	12.50
L063B	6.17	18.00	5.57	15.00	.39	8.00	9.63	11.00	5.54	10.00	6.49	8.00
MEDIAN CONC.	5.240		5.200		.400		9.400		5.430		6.500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	5.2	11.00	3.3	10.00	19.3	8.00	36.3	8.00
L003B	5.0	7.00	3.2	6.00	19.5	10.00	37.5	12.00
L004	5.5	16.00	3.7	14.00	19.7	11.00	108.0 VH	17.00
L006B	4.37	1.00	2.30	1.00	15.9	3.00	34.6	4.00
L010	5.2	11.00	3.8	15.00	18.3	5.00	33.7	3.00
L011B	5.36	14.00	3.28	8.00	20.4	14.00	38.3	15.00
L016	4.84	5.00	2.94	3.00	14.55 L	2.00	38.09	14.00
L020B	5.2	11.00	3.3	10.00	19.4	9.00	36.5	9.00
L023	5.0	7.00	3.1	5.00	21.	16.00	37.	10.50
L031	4.8	4.00	3.0	4.00	18.5	6.00	35.	5.00
L033	7. H	17.00	5.H	0.00	18.	4.00	36.	6.50
L045	4.6	2.50	3.5	12.00	19.8	12.00	37.0	10.50
L046	4.6	2.50	2.8	2.00	10.1 VL	1.00	10.2 VL	1.00
L048	5.4	15.00	3.6	13.00	21.0	16.00	40.	16.00
L049	5.3	13.00	3.9	16.00	19.	7.00	32.	2.00
L061B		0.00		0.00		0.00		0.00
L062B	5.0	7.00	3.3	10.00	21.	16.00	38.	13.00
L063B	5.01	9.00	3.27	7.00	20.	13.00	36.	6.50
MEDIAN CONC.	5.010		3.290		19.400		36.500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	86.50	8.650	10			
L0038	76.00	7.600	10			TECHNICON
L004	125.50	12.550	10	VH		16306
L0068	18.00	1.800	10		BIASED LOW	AUTOANALYZER
L010	103.50	10.350	10			METHLTHYMOL-BLUE,A
L0118	117.00	11.700	10			
L016	103.50	10.350	10	L		MTB
L0208	110.50	11.050	10			AUTO COL MTB
L023	73.00	7.300	10			AUTO. METHYLTHYMOL
L031	64.00	6.400	10			
L033	102.50	12.813	8	H		AUTO MTB
L045	52.00	5.200	10			U.V.-M.T.B.
L046	42.00	4.200	10	VLVL	BIASED LOW	AUTOANALYSER
L048	125.00	12.500	10			TECHNICON
L049	106.00	10.600	10	VH		TURBIDIMETRIC
L0618	33.00	11.000	3		INSUFFICIENT DATA	TECHNICON AAII
L0628	105.50	10.550	10			COLORIMETRIC AUTOM
L0638	105.50	10.550	10			AUTO-TURB

OVERALL AVERAGE RANK IS 9.058

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L0068	18.00	1.800	10			
L046	42.00	4.200	10	VLVL	BIASED LOW	AUTOANALYZER
L045	52.00	5.200	10		BIASED LOW	AUTOANALYSER
L031	64.00	6.400	10			U.V.-M.T.B.
L023	73.00	7.300	10			
L0038	76.00	7.600	10			AUTO. METHYLTHYMOL
L002	86.50	8.650	10			TECHNICON
L010	103.50	10.350	10			
L016	103.50	10.350	10	L		METHLTHYMOL-BLUE,A
L0628	105.50	10.550	10			MTB
L0638	105.50	10.550	10			COLORIMETRIC AUTOM
L049	106.00	10.600	10	VH		AUTO-TURB
L0618	33.00	11.000	3		INSUFFICIENT DATA	TURBIDIMETRIC
L0208	110.50	11.050	10			TECHNICON AAII
L0118	117.00	11.700	10			AUTO COL MTB
L048	125.00	12.500	10			
L004	125.50	12.550	10	VH		TECHNICON
L033	102.50	12.813	8	H		16306
						AUTO MTB

OVERALL AVERAGE RANK IS 9.058

PARAMETER: 16092 SULFATE (ALL METHODS) MG/L

84/06/26

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.00 BASIC ACCEPTABLE ERROR= .76 CONCENTRATION ERROR INCREMENT= .20
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE LAB NO	1 REPORTED VALUE	1 RANK	2 REPORTED VALUE	2 RANK	3 REPORTED VALUE	3 RANK	4 REPORTED VALUE	4 RANK	5 REPORTED VALUE	5 RANK	6 REPORTED VALUE	6 RANK
L002	5.3	20.50	5.4	29.00	.3	11.50	9.3	24.00	5.07	10.00	6.39	19.00
L003	7.0 H	44.00	7.2 H	44.00	.5	32.50	9.0	16.00	5.3	24.00	6.5	26.00
L0038	5.0	5.50	5.0	6.50	.5	32.50	9.0	16.00	5.2	18.00	6.2	9.00
L004	5.2	13.00	5.2	16.50	.1	2.00	10.7	40.00	6.0	41.00	6.7	36.50
L006	5.28	18.50	4.69	3.00	.18	5.00	9.38	25.00	5.06	9.00	6.36	18.00
L006B	4.62	1.00	4.42	2.00	.118	3.00	8.06	1.00	4.38	1.00	5.29	1.00
L007	5.2	13.00	5.3	23.50	.13	4.00	9.0	16.00	4.8	3.00	5.9	3.50
L009	5.2	13.00	5.2	16.50	.31	15.50	8.3	3.00	5.2	18.00	6.3	13.00
L010	5.4	27.50	5.1	10.50	1.0	39.00	9.4	27.00	5.8	37.00	6.5	26.00
L011A	5.53	33.00	5.65	40.00	.50W	0.00	9.85	36.00	5.59	33.00	6.67	35.00
L011B	5.34	23.00	5.66	41.00	.33T	17.50	9.45	29.00	5.43	28.00	6.59	30.00
L013	5.23	16.50	5.19	14.00	.30	11.50	8.88	11.50	5.18	16.00	6.18	8.00
L014	5.6	34.50	5.4	29.00	.9	38.00	9.0	16.00	5.1	12.00	6.1	6.50
L016	5.47	31.00	5.63	39.00	.43	28.00	10.33	39.00	5.29	22.00	6.60	32.50
L019	5.15	10.00	5.17	12.50	.43	28.00	8.78	8.00	5.10	12.00	6.23	10.00
L020A	5.65	37.00	5.60	38.00	.31	15.50	10.16	38.00	6.00	41.00	6.92	39.00
L020B	5.2	13.00	5.3	23.50	.5T	32.50	9.7	34.50	5.7	35.50	6.6	32.50
L021	5.23	16.50	5.17	12.50	.30	11.50	9.39	26.00	5.05	8.00	6.33	15.50
L022	5.4	27.50	5.4	29.00	.7	37.00	8.9	13.00	5.3	24.00	6.4	20.00
L023	5.1	8.50	5.1	10.50	.4	24.00	8.6	5.00	5.0	6.50	6.3	13.00
L024	5.35	24.50	5.37	25.50	.45	30.00	8.88	11.50	5.26	21.00	6.33	15.50
L025	5.35	24.50	5.45	35.00	.30	11.50	9.05	20.00	5.35	27.00	6.50	26.00
L027	5.08	7.00	5.06	9.00	.35	19.50	8.48	4.00	5.16	14.50	5.81	2.00
L028	5.82	39.00	5.41	32.00	1.52 VH	40.00	10.03	37.00	5.99	39.00	7.36	41.00
L029	5.68	38.00	5.20	16.50	.5W	0.00	9.12	21.00	4.85	4.00	6.45	22.00
L031	5.3	20.50	5.4	29.00	.4	24.00	8.8	9.50	5.0	6.50	6.0	5.00
L032	5.31	22.00	5.25	20.00	.35	19.50	9.02	19.00	5.16	14.50	6.34	17.00
L033	6.	40.50	6.	43.10	5.W	0.00	9.	16.00	6.	41.00	7.	40.00
L045	4.9	3.00	4.4	1.00	.1W	1.00	8.7	7.00	5.1	12.00	5.9	3.50
L046	5.0	5.50	5.0	6.50	.4	24.00	8.8	9.50	5.3	24.00	6.1	6.50
L048	5.20	13.00	5.25	20.00	.550	35.00	9.450	29.00	5.520	30.00	6.560	28.00
L049	4.8	2.00	5.0	6.50	1.6 VH	41.00	10.8	41.00	5.9	38.00	6.6	32.50
L050	4.97	4.00	4.96	4.00	.25	7.00	8.67	6.00	4.98	5.00	6.25	11.00
L057	5.60	34.50	5.37	25.50	.37	21.00	9.49	31.00	5.55	32.00	6.57	29.00
L058	5.1	8.50	5.2	16.50	.5	32.50	8.2	2.00	5.2	18.00	6.3	13.00
L060	5.40	27.50	5.25	20.00	.30	11.50	9.22	22.00	5.22	20.00	6.44	21.00
L061	5.43	30.00	5.43	33.50	.43	28.00		0.00		0.00		0.00
L061B	5.28	18.50	5.29	22.00	.41	26.00		0.00		0.00		0.00
L062	5.5	32.00	5.4	29.00	.3	11.50	9.5	32.00	5.6	34.00	6.7	36.50
L062B	5.4	27.50	5.0	6.50	.2	6.00	9.7	34.50	5.7	35.50	6.6	32.50
L063	5.19	43.00	5.43	33.50	.33	17.50	9.45	29.00	5.32	26.00	6.48	23.00
L063B	6.17	42.00	5.57	37.00	.33	22.00	9.63	33.00	5.54	31.00	6.49	24.00
L064	6.0	40.50	5.9	42.00	.29	8.00	11.	42.00	4.5	2.00	7.8	42.00
L066	5.61	36.00	5.47	36.00	.574	36.00	9.28	23.00	5.50	29.00	6.78	38.00
MEDIAN CONC.	5.325		5.295		.370		9.170		5.275		6.445	

PARAMETER: 16092 SULFATE (ALL METHODS) MG/L

84/06/26

SAMPLE LAB NO	7 REPORTED VALUE	7 RANK	8 REPORTED VALUE	8 RANK	9 REPORTED VALUE	9 RANK	10 REPORTED VALUE	10 RANK
L002	5.2	29.50	3.3	26.00	19.3	22.00	36.3	12.00
L003	5.0	17.50	3.5	34.00	19.8	30.50	36.0	9.50
L003B	5.0	17.50	3.2	14.00	19.5	27.00	37.5	25.50
L004	5.5	40.00	3.7	37.00	19.7	29.00	108.0 VH	42.00
L006	5.16	26.00	2.95	6.00	16.5	6.00	36.9	19.00
L006B	4.37	1.00	2.30	1.00	15.9	4.00	34.6	6.00
L007	4.8	5.50	3.0	7.50	18.8	14.50	36.4	13.50
L009	5.0	17.50	3.3	26.00	11.6 VL	2.00	14.8 VL	2.00
L010	5.2	29.50	3.8	39.00	18.3	9.00	33.7	5.00
L011A	5.36	37.00	3.01	9.00	18.6	12.00	37.9	27.00
L011B	5.36	37.00	3.28	22.00	20.4	37.50	38.3	32.00
L013	4.85	10.00	3.08	10.00	19.3	22.00	37.3	23.00
L014	5.0	17.50	3.1	11.50	20.2	35.50	36.4	13.50
L016	4.84	9.00	2.94	5.00	14.55 L	3.00	38.09	30.00
L019	4.88	11.00	3.15	13.00	19.3	22.00	37.2	22.00
L020A	5.41	39.00	3.39	31.00	19.47	26.00	39.4	36.50
L020B	5.2	29.50	3.3	26.00	19.4	24.50	36.5	16.50
L021	5.14	25.00	3.25	18.00	18.80	14.50	37.91	28.00
L022	5.1	23.50	3.3	26.00	21.	41.00	40.	39.00
L023	5.0	17.50	3.1	11.50	21.	41.00	37.	20.50
L024	5.06	22.00	3.23	15.50	18.95	17.00	37.38	24.00
L025	5.20	29.50	3.40	32.00	19.0	18.50	36.5	16.50
L027	4.82	7.00	2.85	3.00	19.95	32.00	38.20	31.00
L028	6.15	41.00	4.59 H	41.00	20.2	35.50	40.5	40.00
L029	4.99	14.00	3.26	19.50	19.6	28.00	38.6	33.00
L031	4.8	5.50	3.0	7.50	18.5	10.50	35.	7.00
L032	4.95	12.50	3.26	19.50	18.57	13.00	36.79	18.00
L033	7. H	42.00	5.H	0.00	18.	8.00	36.	9.50
L045	4.6	3.00	3.5	34.00	19.8	30.50	37.0	20.50
L046	4.6	3.00	2.8	2.00	10.1 VL	1.00	10.2 VL	1.00
L048	5.235	32.00	3.570	36.00	20.40	37.50	39.30	35.00
L049	5.3	34.00	3.9	40.00	19.	18.50	32.	3.50
L050	4.95	12.50	3.31	30.00	18.85	16.00	36.48	15.00
L057	4.83	8.00	3.30	26.00	18.5	10.50	39.5	38.00
L058	5.3	34.00	3.5	34.00	17.8	7.00	45. H	41.00
L060	5.10	23.50	3.245	17.00	19.4	24.50	37.5	25.50
L061		0.00		0.00		0.00		0.00
L061B		0.00		0.00		0.00		0.00
L062	5.3	34.00	3.3	26.00	20.	33.50	39.	34.00
L062B	5.0	17.50	3.3	26.00	21.	41.00	38.	29.00
L063	5.17	27.00	3.23	15.50	19.1	20.00	36.	9.50
L063B	5.01	21.00	3.27	21.00	20.	33.50	36.	9.50
L064	4.6	3.00	2.9	4.00	16.	5.00	32.	3.50
L066	5.36	37.00	3.79	38.00	20.9	39.00	39.4	36.50
MEDIAN CONC.	5.035		3.270		19.300		37.100	

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LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	203.50	20.350	10			
L003	273.00	27.800	10	HH		DIONEX
L003B	171.50	17.150	10			TECHNICON
L004	297.00	29.700	10	VH		1630
L005	135.50	13.550	10			DIONEX-IC
L006B	21.00	2.100	10		BIASED LOW	AUTOANALYZER
L007	104.00	10.400	10			
L009	126.50	12.650	10	VLVL		
L010	249.50	24.950	10			METHYLTHYMOL-BLUE,A
L011A	262.00	29.111	9			
L011B	297.00	29.700	10			
L013	142.50	14.250	10			IC
L014	214.00	21.400	10			IC
L016	238.50	23.850	10	L		MTB
L019	148.50	14.850	10			IC
L020A	341.00	34.100	10			IC
L020B	268.00	26.800	10			AUTO COL MTB
L021	175.50	17.550	10			IC
L022	280.00	28.000	10			
L023	158.00	15.800	10			AUTO. METHYLTHYMOL
L024	206.50	20.650	10			
L025	240.50	24.050	10			
L027	129.00	12.900	10			
L028	385.50	38.550	10	VHH	BIASED HIGH	MESSAN-SCIC
L029	196.00	21.778	9			IC
L031	125.00	12.500	10			
L032	175.00	17.500	10			
L033	240.00	30.000	8	H		AUTO MTB
L045	115.50	11.550	10			U.V.-M.T.B.
L046	83.00	8.300	10	VLVL	BIASED LOW	AUTOANALYSER
L048	295.50	29.550	10			IC
L049	257.00	25.700	10	VH		TURBIDIMETRIC
L050	110.50	11.050	10			IC
L057	255.50	25.550	10			IC
L058	206.50	20.650	10	H		IC
L060	212.50	21.250	10			IC
L061	91.50	30.500	3		INSUFFICIENT DATA	IC
L061B	66.50	22.167	3		INSUFFICIENT DATA	TECHNICON AAII
L062	302.50	30.250	10			IC
L062B	256.00	25.600	10			COLORIMETRIC AUTOM
L063	244.00	24.400	10			IC
L063B	274.00	27.400	10			AUTO-TURB
L064	192.00	19.200	10			IC (DIONEX 10)
L066	348.50	34.850	10		BIASED HIGH	IC

OVERALL AVERAGE RANK IS 21.611

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L006B	21.00	2.100	10		BIASED LOW	AUTOANALYZER
L046	83.00	8.300	10	VLVL	BIASED LOW	AUTOANALYSER
L007	104.00	10.400	10			IC
L050	110.50	11.050	10			U.V.-M.T.B.
L045	115.50	11.550	10			
L031	125.00	12.500	10			
L009	126.50	12.650	10	VLVL		
L027	129.00	12.900	10			DIONEX-IC
L006	135.50	13.550	10			IC
L013	142.50	14.250	10			IC
L019	148.50	14.850	10			AUTO. METHYLTHYMOL
L023	158.00	15.800	10			TECHNICON
L003B	171.50	17.150	10			
L032	175.00	17.500	10			IC
L021	175.50	17.550	10			IC (DIONEX 10)
L064	192.00	19.200	10			
L002	203.50	20.350	10			IC
L058	206.50	20.650	10	H		
L024	206.50	20.650	10			IC
L060	212.50	21.250	10			IC
L014	214.00	21.400	10			IC
L029	196.00	21.778	9		INSUFFICIENT DATA	TECHNICON AAII
L061B	66.50	22.167	3			MTB
L016	238.50	23.850	10	L		
L025	240.50	24.050	10			IC
L063	244.00	24.400	10			METHLTHYMOL-BLUE,A
L010	249.50	24.950	10			IC
L057	255.50	25.550	10			COLORIMETRIC AUTOM
L062B	256.00	25.600	10			TURBIDIMETRIC
L049	257.00	25.700	10	VH		AUTO COL MTB
L020B	268.00	26.800	10			AUTO-TURB
L063B	274.00	27.400	10			DIONEX
L003	278.00	27.800	10	HH		
L022	280.00	28.000	10			IC
L011A	262.00	29.111	9			
L048	295.50	29.550	10			16306
L011B	297.00	29.700	10			AUTO MTB
L004	297.00	29.700	10	VH		IC
L033	240.00	30.000	8	H		IC
L062	302.50	30.250	10			IC
L061	91.50	30.500	3		INSUFFICIENT DATA	IC
L020A	341.00	34.100	10			IC
L066	348.50	34.850	10		BIASED HIGH	WESSAN-SCIC
L028	385.50	38.550	10	VHH	BIASED HIGH	

OVERALL AVERAGE RANK IS 21.611

SULFATE (ALL METHODS)

PARAMETER: 01091 ACIDITY MGCO3/L

84/06/26

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 1.00 BASIC ACCEPTABLE ERROR= .75 CONCENTRATION ERROR INCREMENT= .50
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L005	.06 VL	1.00	.13 VL	1.00	.17 L	1.00		0.00		0.00		0.00
L010	3.5	7.00	3.5	17.00	1.5	10.50	2.0	10.50	2.0	10.50	2.5	14.00
L011A	4.14	12.00	3.37	15.00	1.64	13.00	1.44	6.50	1.92	9.00	1.54	10.00
L016	3.9	11.00	3.3	14.00	1.3	9.00	1.5	8.00	1.3	6.00	.9	4.00
L020A	5.4	18.00	3.4	16.00	1.8	14.50		0.00	5.1 VH	17.00	6.4 VH	18.00
L021	3.34	6.00	3.09	12.00	1.04	4.00		0.00		0.00	2.10	13.00
L022	1.8	2.00	1.9	2.50	2.6 H	18.00	2.0	10.50	4.0 VH	14.50	2.8 H	16.50
L023	3.64	8.00	3.01	11.00	1.58	12.00	1.58	9.00	1.42	7.00	1.58	11.00
L025	3.22	5.00	2.43	5.00	1.16	7.00	1.11	5.00	1.06	5.00	1.10	6.00
L029	4.53	14.00	2.64	8.00	1.08	5.00	.71	3.00	1.02	4.00	.83	3.00
L030	3.89	10.00	2.60	7.00	1.26	8.00	1.44	6.50	1.44	8.00	1.48	8.00
L032	3.051	3.00	2.280	4.00	.624	2.00	.516 L	2.00	.455 L	1.00	.518	1.00
L045	4.3	13.00	3.2	13.00	1.5	10.50		0.00		0.00		0.00
L046	5.0	16.50	3.8	18.00	2.0	16.50	3.2 VH	15.00	2.0	10.50	1.2	7.00
L049	5.	16.50	4.	19.50		0.00		0.00		0.00		0.00
L057	6.0	19.50	3.0	10.00	2.0	16.50	2.7 H	13.00	2.8	12.00	2.6 H	15.00
L060	6.	19.50	6. VH	21.00	4. VH	19.50	3. H	14.00	5. VH	16.00	2.	12.00
L062	6.4 H	21.00	4.0	19.50	4.0 VH	19.50	2.5	12.00	4.0 VH	14.50	1.5	9.00
L063	3.13	4.00	1.90	2.50	.93	3.00	.46 L	1.00	.81	2.00	.58	2.00
L064	4.6	15.00	2.8	9.00	1.8	14.50	3.6 VH	16.00	3.1	13.00	2.8 H	16.50
L066	3.67	9.00	2.49	6.00	1.14	6.00	.774	4.00	.858	3.00	.919	5.00
MEDIAN CONC.	3.900		3.010		1.500		1.540		1.920		1.520	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L005		0.00		0.00		0.00		0.00
L010	3.0	10.00	3.0 VH	14.00	3.0 H	14.00	1.5	9.50
L011A	2.41	5.00	1.44	8.00	.43 L	4.00	1.92	14.00
L016	3.0	10.00	1.6	10.00	2.2	12.00	1.1	3.00
L020A	5.8 VH	18.00		0.00		0.00	2.4	17.00
L021		0.00		0.00		0.00		0.00
L022	1.6	1.00	2.0	12.00	.9T	5.00	1.6	11.00
L023	2.69	7.00	1.11	7.00	1.74	8.00	1.42	8.00
L025	2.10	3.00	.82	5.00	.92	6.00	1.19	6.00
L029	2.40	4.00	.66T	4.00	.26T L	3.00	1.20	7.00
L030	2.53	6.00	.91	6.00	1.99	9.00	1.17	5.00
L032	2.842	8.00	-.17 VL	1.00	-1.20 VL	1.00	.9602	2.00
L045	3.1	12.00		0.00		0.00	1.8	12.00
L046	3.0	10.00	1.5	9.00	1.6	7.00	1.5	9.50
L049		0.00		0.00		0.00		0.00
L057	3.8	14.00	2.0	12.00	2.1	11.00	1.9	13.00
L060	5. H	16.00	2.	12.00	2.	10.00	2.	15.50
L062	4.0	15.00	4.0 VH	15.00	2.5	13.00	4.0 VH	18.00
L063	5.68 VH	17.00	.35 L	3.00	0.00 VL	2.00	.81	1.00
L064	3.6	13.00	5.1 VH	16.00	22. VH	15.00	2.0	15.50
L066	2.06	2.00	.215 L	2.00	.024W	0.00	1.16	4.00
MEDIAN CONC.	3.000		1.470		1.740		1.500	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L005	3.00	1.000	3	VLVLL	INSUFFICIENT DATA	MANUAL/AUTO TITRAT
L010	117.00	11.700	10	VHH		POTENTIOMETRIC TIT
L011A	96.50	9.650	10	L		
L016	87.00	8.700	10			TITRATION
L020A	118.50	16.929	7	VHVHVH	BIASED HIGH	ELECTR/GRANS
L021	35.00	8.750	4		INSUFFICIENT DATA	TOTAL-GRANS
L022	93.00	9.300	10	HVHH		TITRATION TO PH8.3
L023	88.00	8.800	10			POTENTIOMETRIC
L025	53.00	5.300	10		BIASED LOW	TFE AUTO TITRATION
L029	55.00	5.500	10	L		AUTOMATED TITR
L030	73.50	7.350	10			POTENTIOMET.
L032	25.00	2.500	10	LLVLVL	BIASED LOW	GRANS-TITR.
L045	60.50	12.100	5			AUTO.PHENOLPHT.
L046	119.00	11.900	10	VH		POTENTIOMET.PH 8.3
L049	36.00	18.000	2		INSUFFICIENT DATA	TO PH 8.3
L057	136.00	13.600	10	HH		TITRATION
L060	155.50	15.550	10	VHVHHVHH	BIASED HIGH	TITRAT-8.3
L062	156.50	15.650	10	HVHVHVHVH	BIASED HIGH	TITRATION
L063	37.50	3.750	10	LVHLVL	BIASED LOW	EP TITR
L064	143.50	14.350	10	VHHVHVH		GRAN TITRA.
L066	41.00	4.556	9	L	BIASED LOW	TITRATION TO 8.3

OVERALL AVERAGE RANK IS 9.611

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L005	3.00	1.000	3	VLVLL	INSUFFICIENT DATA	MANUAL/AUTO TITRAT
L032	25.00	2.500	10	LLVLVL	BIASED LOW	GRANS-TITR.
L063	37.50	3.750	10	LVHLVL	BIASED LOW	EP TITR
L066	41.00	4.556	9	L	BIASED LOW	TITRATION TO 8.3
L025	53.00	5.300	10		BIASED LOW	TFE AUTO TITRATION
L029	55.00	5.500	10	L		AUTOMATED TITR
L030	73.50	7.350	10			POTENTIOMET.
L016	87.00	8.700	10			TITRATION
L021	35.00	8.750	4		INSUFFICIENT DATA	TOTAL-GRANS
L023	88.00	8.800	10			POTENTIOMETRIC
L022	93.00	9.300	10	HVHH		TITRATION TO PH8.3
L011A	96.50	9.650	10	L		
L010	117.00	11.700	10	VHH		POTENTIOMETRIC TIT
L046	119.00	11.900	10	VH		POTENTIOMET.PH 8.3
L045	60.50	12.100	5			AUTO.PHENOLPHT.
L057	136.00	13.600	10	HH		TITRATION
L064	143.50	14.350	10	VHHVHVH		GRAN TITRA.
L060	155.50	15.550	10	VHVHHVHH	BIASED HIGH	TITRAT-8.3
L062	156.50	15.650	10	HVHVHVHVH	BIASED HIGH	TITRATION
L020A	118.50	16.929	7	VHVHVH	BIASED HIGH	ELECTR/GRANS
L049	36.00	18.000	2		INSUFFICIENT DATA	TO PH 8.3

OVERALL AVERAGE RANK IS 9.611

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PAPAMETER: 06192 TOTAL ALKALINITY MG CACO3/L

84/06/26

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 2.50 BASIC ACCEPTABLE ERROR= 1.20 CONCENTRATION ERROR INCREMENT= .08

LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	<1.	0.00	<1.	0.00	<1.	0.00	18.6	18.00	11.2	18.00	11.6	24.00
L003		0.00		0.00		0.00	16.2	4.00	9.4	4.50	9.0	5.00
L004		0.00		0.00		0.00	16.1	3.00	9.0	2.00	9.1	7.00
L005		0.00		0.00		0.00	17.8	13.00	9.4	4.50	1.1 VL	1.00
L006	.565	10.00	0.	2.50	.243 L	4.00	16.43	7.00	9.42	6.00	9.29	8.00
L010	0.W	0.00	0.W	0.00	.5T	5.50	15.0 L	1.00	8.5 L	1.00	9.0	5.00
L011A	.10W	0.00	-.52 L	1.00	.52	7.00	16.7	8.00	10.1	11.00	9.90	13.00
L016	0.	4.00	0.	2.50	.16 L	2.00	16.97	10.00	9.54	9.00	8.96	3.00
L022	0.W	0.00	.5T	4.00	.5T	5.50	16.	2.00	9.5	8.00	9.3	9.00
L023	0.0	4.00	1.00	9.50	2.00	15.50	18.0	14.50	11.0	16.00	11.0	20.50
L024	.07	8.00	.90	6.00	1.89	13.00	18.26	17.00	11.24	19.00	10.93	19.00
L027	0.	4.00	1.101	11.00	2.038	17.00	19.24	23.00	11.97	22.00	11.48	23.00
L029	.40W	0.00	1.00T	9.50	1.64T	10.00	16.3	5.00	9.46	7.00	9.50	11.00
L030	0.	4.00	.96	8.00	1.86	12.00	19.7	24.00	12.1	24.00	10.6	17.50
L031	.1W	0.00	.1W	0.00	.2 L	3.00	18.0	14.50	10.4	13.00	10.0	14.50
L032	0.	4.00	.946	7.00	1.95	14.00	19.04	22.00	11.78	21.00	11.35	22.00
L033	5.W	0.00	5.W	0.00	5.W	0.00	19.	20.50	12.	23.00	8. L	2.00
L045	.05W	0.00	.05W	0.00	.1 L	1.00	16.4	6.00	9.6	10.00	9.4	10.00
L046		0.00		0.00		0.00	16.9	9.00	9.2	3.00	9.0	5.00
L048	1.8	11.00	3.1 VH	14.00	4.1 VH	18.00	20.3 H	25.00	13.6 VH	25.00	13.1 VH	25.00
L049		0.00		0.00	1.	8.00	17.	11.00	11.	16.00	10.	14.50
L057	.1T	9.00	1.8	12.00	1.7	11.00	18.9	19.00	11.3	20.00	10.6	17.50
L062	0.	4.00	2.	13.00	2.	15.50	19.	20.50	11.	16.00	11.	20.50
L063	0.00	4.00	.83	5.00	1.43	9.00	17.67	12.00	10.56	14.00	10.32	16.00
L064	1.W	0.00	1.W	0.00	1.W	0.00	18.1	16.00	10.2	12.00	9.6	12.00
MEDIAN CONC.	0.000		.953		1.535		17.800		10.400		9.900	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	1.4	10.50	39.3	7.50	77.8	2.00	1.4	9.00
L003		0.00	39.0	3.50	80.1	7.50		0.00
L004		0.00	39.7	6.00	79.9	5.00		0.00
L005	1.1	8.00	4.1 VL	1.00	82.	13.50	.10 L	2.00
L006	0. L	1.50	40.74	14.00	81.99	12.00	0. L	1.00
L010	0.W	0.00	38.0	2.00	79.0	4.00	.5T	5.00
L011A	.73	6.00	40.6	13.00	82.0	13.50	.83	6.00
L016	0. L	1.50	40.42	11.00	83.63	17.00	.11 L	3.00
L022	.1T L	3.50	39.	3.50	80.	6.00	.9T	7.00
L023	2.00	17.50	41.0	15.00	77.0	1.00	2.00	17.50
L024	1.66	13.00	41.58	16.00	82.10	15.00	1.87	15.00
L027	1.754	15.00	43.42	22.00	85.10	24.00	1.884	16.00
L029	1.16T	9.00	40.5	12.00	81.5	11.00	1.66T	12.00
L030	1.76	16.00	44.7	25.00	88.2	25.00	1.82	14.00
L031	.1 L	3.50	43.5	23.00	85.	22.50	.4	4.00
L032	1.721	14.00	42.87	19.00	84.85	21.00	1.791	13.00
L033	5.W	0.00	42.	17.50	85.	22.50	5.W	0.00
L045	.33	5.00	40.3	10.00	80.1	7.50		0.00
L046	5.5 VH	20.00	39.9	7.50	81.1	10.00		0.00
L048	3.7 VH	19.00	43.4	21.00	84.3	20.00	4.3 VH	19.00
L049	1.	7.00	40.	9.00	81.	9.00	1.	8.00
L057	1.4	10.50	44.1	24.00	84.0	18.50	1.6	11.00
L062	2.	17.50	42.	17.50	83.	16.00	2.	17.50
L063	1.54	12.00	39.62	5.00	78.53	3.00	1.54	10.00
L064	1.W	0.00	43.	20.00	84.	18.50	1.W	0.00
MEDIAN CONC.	1.400		40.600		82.000		1.540	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	89.00	12.714	7			
L003	24.50	4.900	5			AUTO.PH
L004	23.00	4.600	5		BIASED LOW	10101
L005	43.00	6.143	7	VLVLL		
L006	66.00	6.600	10	LLL		TITROPROCESSOR
L010	23.50	3.357	7	LL	BIASED LOW	POTENTIOMETRIC TIT
L011A	78.50	8.722	9	L		
L016	63.00	6.300	10	LLL		TITRATION
L022	48.50	5.389	9	L	BIASED LOW	
L023	131.00	13.100	10			POTENTIOMETRIC
L024	141.00	14.100	10			
L027	177.00	17.700	10		BIASED HIGH	
L029	86.50	9.611	9			AUTO.TITRIMETRY
L030	169.50	16.950	10			POTENTIOMETRIC
L031	98.00	12.250	8	LL		
L032	157.00	15.700	10			
L033	85.50	17.100	5	L		TITRIMETER
L045	43.50	7.071	7	L		AUTO. BROMOPHENOL
L046	54.50	9.083	6	VH		POTENT/TIT TO 4.5/
L048	197.00	19.700	10	VHVHHVHVHVHVH	BIASED HIGH	TITRATION
L049	82.50	10.313	8			TO PH 4.5
L057	152.50	15.250	10			TITRATION
L062	158.00	15.800	10			TITRATION
L063	90.00	9.000	10			EP TITR
L064	78.50	15.700	5			METHOD 310.1

OVERALL AVERAGE RANK IS 11.435

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L010	23.50	3.357	7	LL	BIASED LOW	POTENTIOMETRIC TIT
L004	23.00	4.600	5		BIASED LOW	10101
L003	24.50	4.900	5			AUTO.PH
L022	48.50	5.389	9	L	BIASED LOW	
L005	43.00	6.143	7	VLVLL		
L016	63.00	6.300	10	LLL		TITRATION
L006	66.00	6.600	10	LLL		TITROPROCESSOR
L045	49.50	7.071	7	L		AUTO. BROMOPHENOL
L011A	78.50	8.722	9	L		
L063	90.00	9.000	10			EP TITR
L046	54.50	9.083	6	VH		POTENT/TIT TO 4.5/
L029	86.50	9.611	9			AUTO.TITRIMETRY
L049	82.50	10.313	8			TO PH 4.5
L031	98.00	12.250	8	LL		
L002	89.00	12.714	7			
L023	131.00	13.100	10			POTENTIOMETRIC
L024	141.00	14.100	10			
L057	152.50	15.250	10			TITRATION
L032	157.00	15.700	10			
L064	78.50	15.700	5			METHOD 310.1
L062	158.00	15.800	10			TITRATION
L030	169.50	16.950	10			POTENTIOMETRIC
L033	85.50	17.100	5	L		TITRIMETER
L027	177.00	17.700	10		BIASED HIGH	
L048	197.00	19.700	10	VHVHHVHVHVHVH	BIASED HIGH	TITRATION

OVERALL AVERAGE RANK IS 11.435

TOTAL ALKALINITY

38

PARAMETER: 06282 GRAND TITR ALK MG/LCAC03

84/06/26

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .05 BASIC ACCEPTABLE ERROR= .50 CONCENTRATION ERROR INCREMENT= .10
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L003	-2.0	6.00	-.5	8.00	-.3	2.00		0.00		0.00		0.00
L004	-.07 VH	9.00	-.20	9.00	.03	3.00	3.88 VL	1.00	.26 VL	1.00	2.17 VL	2.00
L014	-1.9	7.00	-.75	5.00	.18	7.00	16.35	3.00	9.6	4.00	9.2	6.00
L019	-2.17T	3.00	-.87T	4.00	-.45T L	1.00	17.2	7.00	9.98	6.00	9.54	9.00
L020A	0.0W	0.00	0.0W	0.00	.3	8.50	17.1	6.00	10.4	8.00	9.8	10.00
L021	2.18 VH	10.00	1.07 VH	10.00	.53	10.00		0.00		0.00	.79 VL	1.00
L024	-1.68	8.00	-.65	6.00	.16	6.00	16.26	2.00	9.35	2.00	9.12	5.00
L027	-2.1	4.50	-.91	2.00	1.803 VH	11.00	16.55	4.00	9.486	3.00	9.228	7.00
L030	-2.34	1.00	-.89	3.00	.07	5.00	17.7	8.50	10.2	7.00	8.64	3.00
L032	-2.2	2.00	-.92	1.00	.0444	4.00	17.09	5.00	9.859	5.00	9.379	8.00
L058	-2.1	4.50	-.6	7.00	.3	8.50	17.7	8.50	10.8	9.00	8.8	4.00
MEDIAN CONC.	-2.050		-.700		.160		17.090		9.859		9.160	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L003	.2	9.00		0.00		0.00	1.1 VH	10.00
L004	-.04	8.00	9.56 VL	2.00	19.23 VL	1.00	0.00	5.00
L014	-.15	3.00	40.1	4.00	81.6	6.00	.20	8.50
L019	-.09T	6.00	40.6	5.00	81.4	5.00	-.02T	3.00
L020A	.4 H	10.00	41.3	8.00	77.0	2.00	.2	8.50
L021		0.00		0.00		0.00		0.00
L024	-.08	7.00	39.60	3.00	79.42	3.00	.03	6.00
L027	-.24	2.00	40.91	7.00	82.32	7.00	-.09	1.00
L030	-.13	4.00	42.8	9.00	86.4	9.00	-.01	4.00
L032	-.12	5.00	40.83	6.00	82.85	8.00	-.07	2.00
L058	-.8 L	1.00	4.1 VL	1.00	80.	4.00	.1	7.00
MEDIAN CONC.	-.105		40.600		81.400		.015	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING
L003	35.00	7.000	5	
L004	41.00	4.100	10	VH
L014	53.50	5.350	10	VHVLVLVLVLVL
L019	49.00	4.900	10	
L020A	61.00	7.625	8	L
L021	31.00	7.750	4	H
L024	48.00	4.800	10	VHVHVL
L027	48.50	4.850	10	
L030	53.50	5.350	10	VH
L032	46.00	4.600	10	
L058	54.50	5.450	10	LVL

OVERALL AVERAGE RANK IS 5.371

INSUFFICIENT DATA

METHOD CODING
AUTOMATED PH/ALK
TITRAPROCESSOR
ELECTR/GRANS
STRONG-ACIDITY
POTENTIOMETRIC
TITRATION

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING
L004	41.00	4.100	10	VHVLVLVLVLVL
L032	46.00	4.600	10	
L024	48.00	4.800	10	
L027	48.50	4.850	10	VH
L019	49.00	4.900	10	L
L030	53.50	5.350	10	
L014	53.50	5.350	10	
L058	54.50	5.450	10	LVL
L003	35.00	7.000	5	VH
L020A	61.00	7.625	8	H
L021	31.00	7.750	4	VHVHVL
OVERALL AVERAGE RANK IS		5.371		

METHOD CODING

POTENTIOMETRIC
TITRAPROCESSOR
TITRATION
AUTOMATED PH/ALK
ELECTR/GRANS
STRONG-ACIDITY

INSUFFICIENT DATA

GRAND TITR ALK

84/06/26

PARAMETER: 01092 PH PH UNITS

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 0.00 BASIC ACCEPTABLE ERROR= .25 CONCENTRATION ERROR INCREMENT=0.00
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	4.19	5.00	4.77	14.50	5.55	12.00	7.23	22.50	7.23	34.00	7.15	29.00
L003	4.4	19.50	4.9	34.50	5.6	16.00	6.7 VL	1.00	6.7 L	1.50	6.7 L	2.50
L004	4.3	9.00	5.0	36.50	5.4	5.00	7.1	7.50	7.1	22.00	7.0	15.50
L005	4.7 H	38.00	4.9	34.50	5.9 H	38.00	7.2	16.50	7.2	32.50	7.2	33.00
L006	4.38	15.50	4.77	14.50	5.53	13.00	6.80 VL	3.00	6.95	6.00	6.74 L	4.00
L007	4.37	14.00	4.81	26.00	5.68	23.00	7.30	29.00	7.09	20.00	7.02	18.00
L009	4.46	31.50	4.82	28.00	5.66	22.00	7.36	31.50	7.18	27.50	7.19	32.00
L010	4.3	9.00	4.6	4.50	5.4	5.00	7.0	4.50	6.8 L	3.00	6.6 VL	1.00
L011A	4.53	37.00	4.76	12.00	5.76	33.00	7.44	36.00	7.03	16.00	7.14	27.50
L013	4.46	31.50	4.78	17.50	5.71	28.50	7.18	11.50	7.18	27.50	7.48 VH	37.00
L014	4.14 L	4.00	4.52 L	3.00	5.50	8.50	7.22	21.00	7.14	24.00	7.16	30.00
L016	4.30	9.00	4.60	4.50	5.70	25.50	7.20	16.50	7.00	12.50	7.00	15.50
L019	4.29	6.00	4.64	6.00	5.05 VL	1.00	7.24	24.00	7.15	25.50	7.14	27.50
L020A	4.43	28.50	4.87	32.50	5.71	28.50	7.33	30.00	7.19	29.50	6.93	10.50
L021	4.5	35.00	5.0	36.50	5.8	35.00	7.4	33.50	7.2	32.50	7.3	35.50
L022	4.08 L	3.00	5.24 VH	38.00	5.28 L	3.00	6.79 VL	2.00	6.70 L	1.50	6.70 L	2.50
L023	4.35	12.00	4.70	8.50	5.60	16.00	7.25	26.50	7.00	12.50	6.85	5.00
L024	4.4	19.50	4.8	22.00	5.7	25.50	7.1	7.50	7.0	12.50	6.9	6.50
L025	4.42	26.00	4.83	29.00	5.83	37.00	7.09	6.00	6.98	7.50	6.92	8.50
L027	4.444	30.00	4.842	30.00	5.703	27.00	7.241	25.00	7.193	31.00	7.121	24.00
L029	4.30	9.00	4.86	31.00	5.82	36.00	7.27	28.00	6.98	7.50	7.09	22.00
L030	4.38	15.50	4.77	14.50	5.52	10.50	7.23	22.50	7.07	18.50	6.95	12.50
L031	4.42	26.00	4.78	17.50	5.65	20.50	7.36	31.50	7.24	35.00	7.21	34.00
L032	4.43	28.50	4.79	19.00	5.75	32.00	7.40	33.50	7.19	29.50	7.18	31.00
L033	4.4	19.50	4.8	22.00	5.6	16.00	7.0	4.50	6.9	4.00	6.9	6.50
L045	4.41	23.50	4.81	26.00	5.60	16.00	7.11	9.00	6.94	5.00	7.13	25.50
L046	4.02 VL	1.50	4.67	7.00	5.49	7.00	7.18	11.50	7.07	18.50	7.13	25.50
L048	4.47	33.00	4.80	22.00	5.63	19.00	7.20	16.50	7.04	17.00	7.08	20.50
L049	4.3	9.00	4.5 L	2.00	5.4	5.00	7.2	16.50	7.1	22.00	7.0	15.50
L050	4.02 VL	1.50	4.48 L	1.00	5.24 VL	2.00	7.20	16.50	6.99	9.50	6.92	8.50
L057	4.52	36.00	4.80	22.00	5.65	20.50	7.20	16.50	7.02	15.00	6.95	12.50
L058	4.48	34.00	4.87	32.50	5.69	24.00	7.25	26.50	7.10	22.00	7.05	19.00
L060	4.40	19.50	4.80	22.00	5.50	8.50	7.20	16.50	7.15	25.50	7.10	23.00
L061	4.40	19.50	4.75	11.00	5.74	30.50		0.00		0.00		0.00
L062	4.4	19.50	4.7	8.50	5.6	16.00	7.2	16.50	7.0	12.50	7.0	15.50
L063	4.42	26.00	4.81	26.00	5.77	34.00	7.51 H	37.00	7.28	36.00	7.08	20.50
L064	4.36	13.00	4.74	10.00	5.52	10.50	7.12	10.00	6.99	9.50	6.93	10.50
L066	4.41	23.50	4.77	14.50	5.74	30.50	7.42	35.00	7.31	37.00	7.30	35.50
MEDIAN CONC.	4.400		4.795		5.640		7.200		7.070		7.050	

PARAMETER: 01092 PH — PH UNITS — 84/06/26

SAMPLE LAB NO	7 REPORTED VALUE	7 RANK	8 REPORTED VALUE	8 RANK	9 REPORTED VALUE	9 RANK	10 REPORTED VALUE	10 RANK
L002	5.04	4.50	8.32 VH	37.00	8.30 H	36.00	5.70	29.00
L003	5.3	30.50	7.1 VL	1.00	7.9	2.50	6.0 VH	35.50
L004	5.1	7.00	8.0 H	35.00	8.2	34.00	6.0 VH	35.50
L005	6.4 VH	37.00	7.6	11.00	8.0	17.50	5.7	29.00
L006	5.32	34.00	7.57	7.50	7.94	11.00	5.57	18.50
L007	5.28	27.50	7.75	22.00	7.97	14.00	5.52	10.50
L009	5.16	11.00	7.73	19.00	8.12	31.00	5.52	10.50
L010	5.0	2.00	7.4 L	3.00	7.8	2.50	5.3 L	2.00
L011A	5.31	33.00	7.52	5.00	8.19	33.00	5.69	27.00
L013	5.30	30.50	7.74	21.00	8.31 H	37.00	5.53	12.50
L014	5.12	9.00	7.88	31.00	8.16	32.00	5.60	22.00
L016	5.20	16.50	7.60	11.00	7.95	12.00	5.90 H	34.00
L019	5.03	3.00	7.72	17.00	8.02	21.00	5.46	8.00
L020A	5.22	19.00	7.39 L	2.00	7.98	15.00	5.61	24.00
L021	5.3	30.50	8.0 H	35.00	8.1	29.50	5.6	22.00
L022	4.87 L	1.00	7.50	4.00	7.92	10.00	5.56	17.00
L023	5.20	16.50	7.80	25.00	7.65 L	1.00	6.05 VH	37.00
L024	5.2	16.50	7.8	25.00	7.9	8.50	5.6	22.00
L025	5.24	21.00	7.55	6.00	7.88	6.00	5.84 H	33.00
L027	5.265	25.00	7.809	27.00	8.088	26.00	5.535	14.00
L029	5.26	24.00	7.84	28.50	8.04	24.00	5.82	32.00
L030	5.19	13.50	7.73	19.00	8.03	22.50	5.44	7.00
L031	5.25	23.00	7.90	32.00	8.1	29.50	5.59	20.00
L032	5.27	26.00	7.97	33.00	8.08	25.00	5.53	12.50
L033	5.1	7.00	7.6	11.00	8.0	17.50	4.9 VL	1.00
L045	5.24	21.00	7.62	14.00	7.84	4.00	5.35	3.00
L046	5.19	13.50	7.78	23.00	8.01	20.00	5.68	26.00
L048	5.24	21.00	7.66	15.00	8.00	17.50	5.43	5.50
L049	5.1	7.00	7.8	25.00	8.0	17.50	5.5	9.00
L050	5.04	4.50	7.67	16.00	7.96	13.00	5.43	5.50
L057	5.15	10.00	7.84	28.50	8.03	22.50	5.63	25.00
L058	5.30	30.50	7.73	19.00	8.09	27.50	5.55	15.50
L060	5.20	16.50	7.60	11.00	7.85	5.00	5.55	15.50
L061		0.00		0.00		0.00		0.00
L062	5.4	36.00	7.6	11.00	7.9	8.50	5.7	29.00
L063	5.18	12.00	8.00 H	35.00	8.24	35.00	5.38	4.00
L064	5.28	27.50	7.57	7.50	7.89	7.00	5.57	18.50
L066	5.37	35.00	7.87	30.00	8.09	27.50	5.75	31.00
MEDIAN CONC.	5.220		7.730		8.000		5.570	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	223.50	22.350	10	VHH		
L003	144.50	14.450	10	VLLLVLVH		AUTOMATED PH/ALK
L004	207.00	20.700	10	HVH		10301
L005	287.00	28.700	10	HHVH		AUTO TITRATION
L006	127.00	12.700	10	VLL		METER
L007	204.00	20.400	10			
L009	244.00	24.400	10			
L010	36.50	3.650	10	LVLLL	BIASED LOW	POTENTIOMETRIC
L011A	259.50	25.950	10			
L013	254.50	25.450	10	VHH		GLASS ELECTRODE
L014	184.50	18.450	10	LL		ELECTRODE
L016	157.00	15.700	10	H		
L019	139.00	13.900	10	VL		ELECTROMETRIC
L020A	219.50	21.950	10	L		ELECTROMETER
L021	325.00	32.500	10	H	BIASED HIGH	
L022	82.00	8.200	10	LVHLVLLLL	BIASED LOW	
L023	160.00	16.000	10	LVH		ELECTROMETRIC
L024	165.50	16.550	10			
L025	180.00	18.000	10	H		
L027	259.00	25.900	10			
L029	242.00	24.200	10			
L030	156.00	15.600	10			FISHER-ELECT.
L031	269.00	26.900	10			POTENTIOMETRIC
L032	270.00	27.000	10			
L033	109.00	10.900	10	VL		
L045	147.00	14.700	10			PH METER
L046	153.50	15.350	10	VL		ELECTROMETRIC
L048	187.00	18.700	10			PH ELECTRODE
L049	128.50	12.850	10	L		PH METER
L050	78.00	7.800	10	VLLVL	BIASED LOW	METER
L057	208.50	20.850	10			PH-METER
L058	250.50	25.050	10			METER
L060	163.00	16.300	10			
L061	61.00	20.333	3		INSUFFICIENT DATA	ELECTRODE
L062	173.00	17.300	10			METER ^ ELECTRODE
L063	265.50	26.550	10	HH		ELECTRODE
L064	124.00	12.400	10			GLASS ELECTRODE
L066	299.50	29.950	10			CORNING METER
						PH METER

OVERALL AVERAGE RANK IS 19.153

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LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L010	36.50	3.650	10	LVLLL	BIASED LOW	POTENTIOMETRIC
L050	78.00	7.800	10	VLLVL	BIASED LOW	PH-METER
L022	82.00	8.200	10	LVHLVLLLL	BIASED LOW	
L033	109.00	10.900	10	VL		PH METER
L064	124.00	12.400	10			CORNING METER
L006	127.00	12.700	10	VLL		METER
L049	128.50	12.850	10	L		METER
L019	139.00	13.900	10	VL		ELECTROMETRIC
L003	144.50	14.450	10	VLLLVLVH		AUTOMATED PH/ALK
L045	147.00	14.700	10			ELECTROMETRIC
L046	153.50	15.350	10	VL		PH ELECTRODE
L030	156.00	15.600	10			POTENTIOMETRIC
L016	157.00	15.700	10	H		
L023	160.00	16.000	10	LVH		ELECTROMETRIC
L060	163.00	16.300	10			ELECTRODE
L024	165.50	16.550	10			
L062	173.00	17.300	10			ELECTRODE
L025	180.00	18.000	10	H		
L014	184.50	18.450	10	LL		ELECTRODE
L048	187.00	18.700	10			PH METER
L061	61.00	20.333	3		INSUFFICIENT DATA	METER & ELECTRODE
L007	204.00	20.400	10			
L004	207.00	20.700	10	HVH		10301
L057	208.50	20.850	10			METER
L020A	219.50	21.950	10	L		ELECTROMETER
L002	223.50	22.350	10	VHH		
L029	242.00	24.200	10			FISHER-ELECT.
L009	244.00	24.400	10			
L058	250.50	25.050	10			
L013	254.50	25.450	10	VHH		GLASS ELECTRODE
L027	259.00	25.900	10			
L011A	259.50	25.950	10			
L063	265.50	26.550	10	HH		GLASS ELECTRODE
L031	269.00	26.900	10			
L032	270.00	27.000	10			
L005	287.00	28.700	10	HHVH		AUTO TITRATION
L066	299.50	29.950	10			PH METER
L021	325.00	32.500	10	H	BIASED HIGH	

OVERALL AVERAGE RANK IS 19.153

84/06/26

PARAMETER: 00392 SPECIFIC CONDUCTANCE UMHO/CM

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR=50.00 BASIC ACCEPTABLE ERROR= 2.80 CONCENTRATION ERROR INCREMENT= .08
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	43.26 VH	32.00	33.24	26.00	7.83	10.00	68.88	26.00	39.61	25.00	39.96	20.00
L003	36.	12.50	32.	10.50	7.3	11.50	67.	16.50	38.	10.50	39.	9.50
L004	24.0 VL	1.00	21.2 VL	1.00	5.4	1.00	46.0 VL	1.00	27.0 VL	1.00	30.1 VL	2.00
L005	37.7	24.00	33.5	28.00	8.8	27.00	66.3	12.50	41.9 H	31.00	45.2 VH	32.00
L006	38.3	25.00	32.5	16.50	7.6	4.50	65.0	6.00	37.8	7.50	38.4	6.00
L007	36.8	17.00	31.8	7.00	8.3	21.50	63.5	3.00	37.8	7.50	38.0	4.00
L009	35.0	5.50	32.6	18.50	8.00	16.00	64.9	5.00	37.5	6.00	38.8	7.00
L010	37.6	23.00	31.9	8.00	7.3	11.50	66.8	14.00	38.4	16.00	39.2	13.50
L011A	29.5 VL	2.00	32.2	13.00	7.80	7.50	66.0	9.50	38.0	10.50	39.2	13.50
L013	35.2	7.00	31.4	6.00	7.8	7.50	65.4	7.50	38.2	15.00	39.4	16.50
L014	40. H	27.50	30.	2.50	<10.	0.00	70.	28.50	40.	27.50	40.	23.50
L019	36.2	14.00	32.4	14.50	9.4	30.00	66.2	11.00	38.0	10.50	39.2	13.50
L021	34.5	4.00	30.0	2.50	7.2	2.50	62.0 L	2.00	35.5 L	2.00	37.0	3.00
L022	40. H	27.50	41. VH	33.00	18. VH	32.00	97. VH	32.00	36.	3.00	30. VL	1.00
L023	36.8	17.00	32.6	18.50	7.92	13.00	67.4	19.00	38.9	17.50	39.8	18.50
L024	35.7	8.00	33.1	24.00	8.0	16.00	69.	27.00	38.9	17.50	39.8	18.50
L025	38.4	26.00	35.7 H	32.00	8.7	25.00	65.4	7.50	38.1	13.50	39.0	9.50
L027	35.9	11.00	32.9	20.00	8.14	20.00	67.5	20.50	39.3	23.00	40.1	27.00
L029	42. VH	31.00	32.	10.50	8.0	16.00	68.	23.00	40.	27.50	40.	23.50
L030	36.8	17.00	33.4	27.00	8.79	26.00	66.3	12.50	39.1	21.00	40.8	29.00
L031	36.3	15.00	32.4	14.50	7.2	2.50	68.	23.00	38.1	13.50	39.2	13.50
L032	35.8	9.50	31.3	5.00	7.6	4.50	67.0	16.50	37.3	5.00	38.2	5.00
L033	37.	21.00	33.	21.50	8.	16.00	68.	23.00	39.	19.50	40.	23.50
L045	35.8	9.50	34.8	29.00	8.3	21.50	71.1	30.00	41.2	30.00	42.1	30.00
L046	35.	5.50	35.	30.50	10.	31.00	70.	28.50	40.	27.50	40.	23.50
L049	45. VH	33.00	35.	30.50	9.	28.00	72. H	31.00	42. H	32.00	44. VH	31.00
L057	32. VL	3.00	31.	4.00	7.3	7.50	64.	4.00	37.	4.00	40.	23.50
L058	37.	21.00	32.	10.50	8.	16.00	67.	16.50	39.	19.50	39.	9.50
L061	36.9	19.00	33.1	24.00	8.6	24.00		0.00		0.00		0.00
L062	36.	12.50	32.	10.50	7.8	7.50	66.	9.50	38.	10.50	39.	9.50
L063	41.5 VH	30.00	32.5	16.50	8.1	19.00	67.5	20.50	39.5	24.00	39.4	16.50
L064	37.	21.00	33.	21.50	8.4	23.00	67.	16.50	40.	27.50	40.	23.50
L066	41.4 VH	29.00	33.1	24.00	9.2	29.00	68.2	25.00	39.2	22.00	40.5	28.00
MEDIAN CONC.	36.800		32.500		8.000		67.000		38.650		39.400	

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PARAMETER: 00392 SPECIFIC CONDUCTANCE UMHO/CM

SAMPLE LAB NO	7 REPORTED VALUE	7 RANK	8 REPORTED VALUE	8 RANK	9 REPORTED VALUE	9 RANK	10 REPORTED VALUE	10 RANK
L002	19.14	26.00	96.07	29.00	229.84	25.00	449.28	22.00
L003	19.	24.00	94.	20.50	224.	16.50	440.	13.50
L004	15.0 L	2.00	74.8 VL	2.00	18.0 VL	1.00	365.0 VL	1.00
L005	18.3	15.50	93.0	14.00	223.	12.00	445.	18.50
L006	17.9	7.00	89.5	4.00	224.0	16.50	433.5	8.00
L007	17.7	5.00	91.4	7.00	210.2	3.00	427.8	4.00
L009	18.6	20.50	91.7	8.50	220.	8.00	435.	10.50
L010	18.4	17.00	93.3	18.50	229.	23.50	449.	21.00
L011A	18.0	9.50	93.0	14.00	224.	16.50	422.	3.00
L013	17.8	6.00	90.9	6.00	219.	6.00	436.	12.00
L014	20.	31.00	90.	5.00	220.	8.00	450.	24.00
L019	18.2	13.50	93.3	18.50	223.	12.00	440.	13.50
L021	17.0	3.00	88.0	3.00	215.0	4.50	415.0	2.00
L022	8. VL	1.00	69. VL	1.00	233.	28.50	460.	30.00
L023	18.1	12.00	95.9	26.00	210.	2.00	442.	15.00
L024	19.2	27.00	96.	27.50	233.	28.50	444.	16.50
L025	18.3	15.50	91.7	8.50	>100.	0.00	>100.	0.00
L027	18.5	18.50	95.3	25.00	229.	23.50	452.	27.00
L029	18.2	13.50	93.0	14.00	226.	20.00	450.	24.00
L030	18.5	18.50	93.1	17.00	228.	22.00	451.	26.00
L031	17.6	4.00	94.	20.50	224.	16.50	448.	20.00
L032	18.8	22.00	92.	10.50	223.	12.00	429.	6.00
L033	19.	24.00	96.	27.50	230.	26.00	453.	28.00
L045	19.3	28.00	99.4 H	31.00	231.	27.00	458.	29.00
L046	20.	31.00	95.	23.00	240.	30.00	465.	31.00
L049	20.	31.00	100. H	32.00	245. H	31.00	435.	10.50
L057	18.	9.50	93.	14.00	220.	8.00	430.	7.00
L058	18.	9.50	93.	14.00	215.	4.50	428.	5.00
L061		0.00		0.00		0.00		0.00
L062	18.	9.50	92.	10.50	224.	16.50	445.	18.50
L063	18.6	20.50	95.	23.00	224.	16.50	444.	16.50
L064	19.	24.00	95.	23.00	221.	10.00	434.	9.00
L066	19.6	29.00	96.5	30.00	227.	21.00	450.	24.00
MEDIAN CONC.	18.350		93.050		224.000		444.000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	241.00	24.100	10	VH		
L003	145.50	14.550	10			RADIOMETER
L004	13.00	1.300	10	VLVLVLVLVLLVLVLVL	BIASED LOW	02041
L005	214.50	21.450	10	HVH		
L006	101.00	10.100	10			METER
L007	79.00	7.900	10			
L009	105.50	10.550	10			
L010	166.00	16.600	10			RADIOMETER
L011A	99.00	9.900	10	VL		
L013	89.50	8.950	10			
L014	177.50	19.722	9	H		ELECTRODE
L019	151.00	15.100	10			CONDUCTIVIMETRIE
L021	28.50	2.850	10	LL	BIASED LOW	COND. METER
L022	189.00	18.900	10	HVHVHVHVLVLVL		
L023	158.50	15.850	10			ELECTROMETRIC
L024	210.50	21.050	10			
L025	137.50	17.188	8	H		
L027	215.50	21.550	10			
L029	203.00	20.300	10	VH		RADIOMETER
L030	216.00	21.600	10			CONDUCTIVITY METER
L031	143.00	14.300	10			
L032	96.00	9.600	10			
L033	230.00	23.000	10			COND METER
L045	265.00	26.500	10	H	BIASED HIGH	HACH METER
L046	261.50	26.150	10		BIASED HIGH	BRIDGE
L049	290.00	29.000	10	VHHHVHHH	BIASED HIGH	METER
L057	84.50	8.450	10	VL		METER
L058	126.00	12.600	10			
L061	67.00	22.333	3		INSUFFICIENT DATA	BRIDGE & CELL
L062	115.00	11.500	10			ELECTRODE
L063	203.00	20.300	10	VH		WHEATSTONE BRIDGE
L064	199.00	19.900	10			
L066	261.00	26.100	10	VH	BIASED HIGH	COND. METER

OVERALL AVERAGE RANK IS 16.506

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L004	13.00	1.300	10	VLVLVLVLVLLVLVLVL	BIASED LOW	02041
L021	28.50	2.850	10	LL	BIASED LOW	COND. METER
L007	79.00	7.900	10			
L057	84.50	8.450	10	VL		METER
L013	89.50	8.950	10			
L032	96.00	9.600	10			
L011A	99.00	9.900	10	VL		
L006	101.00	10.100	10			METER
L009	105.50	10.550	10			
L062	115.00	11.500	10			ELECTRODE
L058	126.00	12.600	10			
L031	143.00	14.300	10			
L003	145.50	14.550	10			RADIOMETER
L019	151.00	15.100	10			CONDUCTIVIMETRIE
L023	158.50	15.850	10			ELECTROMETRIC
L010	166.00	16.600	10			RADIOMETER
L025	137.50	17.188	8	H		
L022	189.00	18.900	10	HVHVHVHVLVLVL		
L014	177.50	19.722	9	H		ELECTRODE
L064	199.00	19.900	10			
L063	203.00	20.300	10	VH		WHEATSTONE BRIDGE
L029	203.00	20.300	10	VH		RADIOMETER
L024	210.50	21.050	10			
L005	214.50	21.450	10	HVH		
L027	215.50	21.550	10			
L030	216.00	21.600	10			CONDUCTIVITY METER
L061	67.00	22.333	3		INSUFFICIENT DATA	BRIDGE & CELL
L033	230.00	23.000	10			COND METER
L002	241.00	24.100	10	VH		
L066	261.00	26.100	10	VH	BIASED HIGH	COND. METER
L046	261.50	26.150	10		BIASED HIGH	BRIDGE
L045	265.00	26.500	10	H	BIASED HIGH	HACH METER
L049	290.00	29.000	10	VHHHVHHH	BIASED HIGH	METER

OVERALL AVERAGE RANK IS 16.506

84/06/26

PARAMETER: 00292 COLOUR HAZEN UNIT

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= 5.00 BASIC ACCEPTABLE ERROR= 3.00 CONCENTRATION ERROR INCREMENT= .20
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	5.	10.50	<5.	0.00	<5.	0.00	20. L	5.00	10.	2.50	5. L	4.00
L003	5.W	0.00	5.W	0.00	5.W	0.00	20. L	5.00	10.	2.50	5. L	4.00
L004	9. H	16.00	12. VH	14.00	5.	6.50	28.	9.00	19.	12.00	5. L	4.00
L005	5.	10.50	5.	10.00	5.	6.50	30.	12.50	20.	14.50	10.	13.50
L010	5.T	10.50	5.T	10.00	5.T	6.50	20. L	5.00	10.	2.50	5. L	4.00
L022	1.T L	2.00	1.T	4.00	0.W	0.00	19. L	2.50	12.	6.00	6.	7.50
L023	5.W	0.00	5.W	0.00	5.W	0.00	30.	12.50	15.	9.00	5. L	4.00
L024	3.	7.00	2.	6.50	1. L	2.50	41. H	19.00	23. VH	18.00	12.	17.50
L027	1.0 L	2.00	1.0	4.00	1.0 L	2.50	31.0	16.00	16.5	11.00	9.5	10.00
L030	2.7	6.00	1.W	1.50	1.W	0.00	37.	18.00	20.	14.50	12.	17.50
L031	1. L	2.00	1.W	1.50	1.W	0.00	19. L	2.50	12.	6.00	6.	7.50
L032	6.	14.00	2.	6.50	5.	6.50	25.	8.00	25. VH	19.00	10.	13.50
L033	1.3 L	4.00	2.5	8.00	.6 L	1.00	31.9	17.00	20.3 H	17.00	9.4	9.00
L045	7.5	15.00	7.5 VH	13.00	7.5	10.00	30.	12.50	20.	14.50	15. H	19.00
L049	5.	10.50	5.	10.00	5.	6.50	15. VL	1.00	10.	2.50	10.	13.50
L057	5.W	0.00	5.W	0.00	5.W	0.00	30.	12.50	20.	14.50	10.	13.50
L058	5.	10.50	5.W	0.00	5.W	0.00	30.	12.50	15.	9.00	10.	13.50
L062	5.	10.50	7. VH	12.00	5.	6.50	30.	12.50	15.	9.00	10.	13.50
L063	2.5	5.00	1.	4.00	1.W	0.00	23.	7.00	12.	6.00	4. L	1.00
MEDIAN CONC.	5.000		2.250		5.000		30.000		15.000		9.500	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	5.	4.50	<5.	0.00	<5.	0.00	<5.	0.00
L003	5.	4.50	5.W	0.00	5.W	0.00	.5W	0.00
L004	12. VH	17.00	22. VH	14.00	2.	6.50	5.	6.00
L005	10.	14.50	<5.	0.00	<5.	0.00	<5.	0.00
L010	5.T	4.50	5.T	11.00	5.T	11.00	5.T	6.00
L022	5.	4.50	1.T	2.50	1.T	3.00	.3T VL	1.00
L023	5.W	1.00	5.W	0.00	5.W	0.00	5.W	0.00
L024	14. VH	19.00	4.	8.00	3.	8.00	2.	3.00
L027	6.5	9.00	2.5	4.00	2.0	6.50	.5W	0.00
L030	6.7	10.00	3.3	7.00	1.7	5.00	1.W	0.00
L031	5.	4.50	1.W	1.00	1.W	1.00	1.W	0.00
L032	10.	14.50	3.	5.50	5.	11.00	5.	6.00
L033	7.8	12.00	4.4	9.00	3.4	9.00	.6 L	2.00
L045	12.5 VH	18.00	7.5 H	13.00	10. VH	13.00	10. VH	9.00
L049	5.	4.50	5.	11.00	5.	11.00	5.	6.00
L057	10.	14.50	5.W	0.00	5.W	0.00	5.W	0.00
L058	10.	14.50	5.	11.00	5.W	0.00	5.W	0.00
L062	7.	11.00	3.	5.50	1.	3.00	5.	6.00
L063	6.	8.00	1.	2.50	1.	3.00	1.W	0.00
MEDIAN CONC.	6.700		3.650		2.000		5.000	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	26.50	5.300	5	LL		
L003	15.00	4.000	4	LL	INSUFFICIENT DATA	
L004	105.00	10.500	10	HVHLVHVH		02011
L005	82.00	11.714	7			
L010	71.00	7.100	10	LL		PT-CO VISUAL COMPA
L022	33.00	3.667	9	LLVL	BIASED LOW	
L023	26.50	6.625	4	L	INSUFFICIENT DATA	VISUAL COMPARISCN
L024	108.50	10.850	10	LHVHVH		
L027	65.00	7.222	9	LL		COLORIMETRIC
L030	79.50	9.938	8		BIASED LOW	
L031	26.00	3.250	8	LL		
L032	104.50	10.450	10	VH		KLETT NO. 42
L033	88.00	8.800	10	LLHL		VISUAL COMP.
L045	137.00	13.700	10	VHHVHHVHVH	BIASED HIGH	COLOUR DISC
L049	76.50	7.650	10	VL		
L057	55.00	13.750	4		INSUFFICIENT DATA	VISUAL
L058	71.00	11.833	6			
L062	89.50	8.950	10	VH		HELLIGE
L063	36.50	4.563	8	L	BIASED LOW	HELLIGE
OVERALL AVERAGE RANK IS		8.533				

LAB NO.	TOTAL RANK	AVERAGE RANK	NO.OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L031	26.00	3.250	8	LL		
L022	33.00	3.667	9	LLVL	BIASED LOW	
L003	15.00	4.000	4	LL	BIASED LOW	
L063	36.50	4.563	8	L	INSUFFICIENT DATA	
L002	26.50	5.300	5	LL	BIASED LOW	HELLIGE
L023	26.50	6.625	4	L		
L010	71.00	7.100	10	LL	INSUFFICIENT DATA	VISUAL COMPARISCN
L027	65.00	7.222	9	LL		PT-CO VISUAL COMPA
L049	76.50	7.650	10	VL		
L033	88.00	8.800	10	LLHL		COLOUR DISC
L062	89.50	8.950	10	VH		KLETT NO. 42
L030	79.50	9.938	8			HELLIGE
L032	104.50	10.450	10	VH		COLORIMETRIC
L004	105.00	10.500	10	HVHLVHVH		
L024	108.50	10.850	10	LHVHVH		02011
L005	82.00	11.714	7			
L058	71.00	11.833	6			
L045	137.00	13.700	10	VHHVHHVHVH	BIASED HIGH	VISUAL COMP.
L057	55.00	13.750	4		INSUFFICIENT DATA	VISUAL
OVERALL AVERAGE RANK IS		8.533				

PARAMETER: 14092 REACTIVE SILICA MG SI/L

84/06/26

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .10 BASIC ACCEPTABLE ERROR= .05 CONCENTRATION ERROR INCREMENT= .08
LABORATORIES YET TO REPORT: NONE.
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.09	8.00	.28 H	19.00	.04	6.00	1.41	15.50	2.25	5.00	1.12	6.00
L003	.110	16.00	.240	18.00	.050	10.50	1.57 H	19.00	2.7 H	18.00	1.43 VH	19.00
L006	.047	4.00	.154	4.00	.004	2.00	1.213	3.00	2.251	6.00	1.031	3.00
L010	.1T	11.50	.2	9.50	.1T H	15.00	1.6 VH	20.00	2.9 VH	20.00	1.5 VH	20.00
L014	.104	14.00	.210	13.50	.048	8.00	1.41	15.50	2.54	17.00	1.29	17.00
L020A	.05W	0.00	.14T L	3.00	.05W	0.00	1.3	7.50	2.4	10.00	1.2	12.00
L022	2.4 VH	19.00	1.2 VH	20.00	1.6 VH	16.00	1.1 VL	1.00	.08 VL	1.00	.19 VL	1.00
L023	.09	8.00	.19	6.00	.09W	0.00	1.36	13.00	2.43	12.00	1.17	3.00
L024	.09T	8.00	.2	9.50	.03T	5.00	1.3	7.50	2.4	10.00	1.2	12.00
L027	.12	13.00	.20	9.50	.05T	10.50	1.35	11.50	2.34	8.00	1.21	14.00
L029	.102	13.00	.214	15.00	.044	7.00	1.42	17.00	2.12 L	3.00	1.26	16.00
L031	.09	8.00	.19	6.00	.05	10.50	1.24	4.50	2.47	13.00	1.10	5.00
L032	.040	2.50	.209	12.00	-.073 VL	1.00	2.33 VH	21.00	4.38 VH	21.00	2.05 VH	21.00
L033	.23W	0.00	.23W	0.00	.23W	0.00	1.29	6.00	2.40	10.00	1.15	7.00
L045	.07T	5.00	.21	13.50	.02T	4.00	1.21	2.00	2.23	4.00	1.07	2.00
L046	.03 L	1.00	.03 VL	1.00	.01	3.00	1.24	4.50	2.11 L	2.00	1.09	4.00
L048	.11	16.00	.23	16.50	.06	13.50	1.35	11.50	2.48	14.50	1.22	15.00
L049	.11	16.00	.23	16.50	.06	13.50	1.56 H	18.00	2.83 VH	19.00	1.38 H	18.00
L060	.04	2.50	.12 L	2.00	.02W	0.00	1.32	10.00	2.30	7.00	1.17	9.00
L062	.1	11.50	.2	9.50	.1W	0.00	1.4	14.00	2.5	16.00	1.2	12.00
L063	.09	8.00	.19	6.00	.05	10.50	1.31	9.00	2.48	14.50	1.17	9.00
MEDIAN CONC.	.090		.200		.043		1.350		2.400		1.200	

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	1.69	10.00	1.12	10.50	.56	7.50	.01	5.50
L003	2.0 VH	18.00	1.4 VH	19.50	.70 H	19.50	.050	7.00
L006	1.565	4.00	1.025	2.00	.526	4.00		0.00
L010	2.1 VH	20.00	1.4 VH	19.50	.7 H	19.50	.1T VH	8.00
L014	1.80	16.00	1.21	16.00	.568	10.00	<.01	0.00
L020A	1.7	12.00	1.1	7.50	.5	1.00	.05W	0.00
L022	.04 VL	1.00	1.3 H	18.00	.56	7.50	-.02T	2.00
L023	1.68	8.50	1.12	10.50	.61	17.00	.09W	0.00
L024	1.7	12.00	1.1	7.50	.6	14.50	.01W	0.00
L027	1.70	12.00	1.13	13.00	.56	7.50	.01T	5.50
L029	1.80	16.00	1.18	14.00	.604	16.00	.003T	4.00
L031	1.59	5.00	1.03	3.00	.51	2.50	.02W	0.00
L032	3.03 VH	21.00	3.35 VH	21.00	.89 VH	21.00	-.15a VL	1.00
L033	1.66	7.00	1.06	4.00	.55	5.00	.23W	0.00
L045	1.56	3.00	1.02	1.00	.51	2.50	.02W	0.00
L046	.23 VL	2.00	1.08	5.00	.53	13.00	.01W	0.00
L048	1.75	14.00	1.12	10.50	.58	12.00		0.00
L049	2.05 VH	19.00	1.29 H	17.00	.63 H	18.00	.002T	3.00
L060	1.65	6.00	1.09	6.00	.57	11.00	.02W	0.00
L062	1.8	16.00	1.2	15.00	.6	14.50	.1W	0.00
L063	1.63	8.50	1.12	10.50	.56	7.50	.1W	0.00
MEDIAN CONC.	1.730		1.120		.573		.007	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	93.00	9.300	10	H		
L003	164.50	16.450	10	HHVHVHVHH	BIASED HIGH	
L006	32.00	3.556	9		BIASED LOW	AUTOANALYZER
L010	163.00	16.300	10	HVHVHVHVHVHHVH	BIASED HIGH	EXTRACTABLE ICAP
L014	127.00	14.111	9			AUTOANALYSER
L020A	53.00	7.571	7	L		AUTO.COL-METER BL
L022	86.50	8.650	10	VHVHVHVLVLVLVLH		
L023	84.00	10.500	8			AUTO. MOLYBDOSILIC
L024	86.00	9.556	9			
L027	109.50	10.950	10			
L029	121.00	12.100	10	L		AUTO.-ASCORBIC
L031	57.50	6.389	9			
L032	142.50	14.250	10	VLVHVHVHVHVHVHVL		
L033	39.00	6.500	6			AUTO COLOR
L045	37.00	4.111	9		BIASED LOW	AUTOMATED ASCORBIC
L046	35.50	3.944	9	LVLLVL	BIASED LOW	AUTOANALYSER
L048	123.50	13.722	9			TECHNICON
L049	158.00	15.800	10	HVHHVHHH	BIASED HIGH	COLOUR
L060	53.50	6.688	8	L		COLOUR
L062	108.50	13.563	8			COLORIMETRIC MOLYB
L063	83.50	9.278	9			MOLYBDATE BLUE
OVERALL AVERAGE RANK IS		10.360				

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L006	32.00	3.556	9			
L046	35.50	3.944	9	LVLLVL	BIASED LOW	AUTOANALYZER
L045	37.00	4.111	9		BIASED LOW	AUTOANALYSER
L031	57.50	6.389	9		BIASED LOW	AUTOMATED ASCORBIC
L033	39.00	6.500	6			
L060	53.50	6.688	8	L		AUTO COLOR
L020A	53.00	7.571	7	L		COLOUR
L022	86.50	8.650	10	VHVHVHVLVLVLVLH		AUTO.COL-METER BL
L063	83.50	9.278	9			
L002	93.00	9.300	10	H		MOLYBDATE BLUE
L024	86.00	9.556	9			
L023	84.00	10.500	8			
L027	109.50	10.950	10			AUTO. MOLYBDOSILIC
L029	121.00	12.100	10	L		
L062	108.50	13.563	8			AUTO.-ASCORBIC
L048	123.50	13.722	9			COLORIMETRIC MOLYB
L014	127.00	14.111	9			TECHNICON
L032	142.50	14.250	10	VLVHVHVHVHVHVHVL		AUTOANALYSER
L049	158.00	15.800	10	HVHHVHHH	BIASED HIGH	
L010	163.00	16.300	10	HVHVHVHVHVHHVH	BIASED HIGH	COLOUR
L003	164.50	16.450	10	HHVHVHVHH	BIASED HIGH	EXTRACTABLE ICAP
OVERALL AVERAGE RANK IS		10.360				

84/06/26

PARAMETER: 07092 NITRATE + NITRITE MG N/L

QUALITY ASSURANCE AND METHODS SECTION
NATIONAL WATER RESEARCH INSTITUTE
BURLINGTON ONTARIO

LRTAP INTERLAB STUDY NO.L6 MAJOR-IONS IN WATER

LOWER LIMIT FOR USE OF BASIC ACCEPTABLE ERROR= .50 BASIC ACCEPTABLE ERROR= .06 CONCENTRATION ERROR INCREMENT= .20
LABORATORIES YET TO REPORT: NONE
LABORATORY RESULTS OMITTED ARE NONE

SAMPLE	1		2		3		4		5		6	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.759	15.00	1.16	19.00	.031	30.00	.279	29.50	.072	7.00	.193	37.00
L003	.750	9.50	1.13	10.00	.035T	8.50	.235	12.00	.08	15.50	.20	13.00
L004	.84	32.00	1.27	34.00	.01	21.50	.27	27.50	.10	34.00	.23	30.00
L005	.78	25.00	1.15	15.00	<.01	0.00	.28	31.00	.07	4.00	.20	13.00
L006	.85	33.50	1.10	4.50	.082 H	32.00	.164 L	1.00	.085	25.50	.173	1.00
L007	.7	1.00	1.2	30.50	0.0	1.00	.3	33.00	.1T	34.00	.2	13.00
L009	.75	9.50	1.15	15.00	.01	21.50	.23	8.00	.08	15.50	.20	13.00
L010	.746	5.00	1.160	19.00	.001T	2.00	.240	14.50	.081	20.50	.208	19.00
L011A	.780	25.00	1.186	29.00	.050W	0.00	.221	4.00	.068	2.00	.192	6.00
L011B	.782	28.00	1.179	25.00	.002T	3.50	.245	17.50	.071	6.00	.198	8.00
L013	.73	3.50	1.11	8.00	.01	21.50	.23	8.00	.08	15.50	.20	13.00
L014	.770	19.50	1.100	4.50	.002	3.50	.228	5.00	.077	10.50	.206	18.00
L019	.775	22.00	1.175	24.00	.019	16.50	.258	24.50	.081	20.50	.212	24.00
L020A	.77	19.50	1.16	19.00	.01T	21.50	.24	14.50	.08	15.50	.21	22.00
L020B	.78	25.00	1.14	12.50	.01W	0.00	.29	32.00	.11	37.00	.24	32.50
L021	.89 H	36.00	1.37 H	36.00	.07 H	31.00	.24	14.50	.10	34.00	.22	26.50
L022	.85	33.50	1.8 VH	38.00	.006	13.00	.23	8.00	.076	9.00	.20	13.00
L023	.78	25.00	1.24	32.00	.01W	0.00	.23	8.00	.08	15.50	.20	13.00
L024	.75	9.50	1.1	4.50	.01	21.50	.25	20.50	.08	15.50	.21	22.00
L027	.755	14.00	1.10	4.50	.005T	8.50	.240	14.50	.075	8.00	.195	7.00
L029	.796	29.00	1.18	27.00	.016	27.00	.256	23.00	.083	23.50	.209	20.00
L030	.75	9.50	1.15	15.00	.01	21.50	.23	8.00	.07	4.00	.19	3.50
L031	.75	9.50	1.13	10.00	.005	8.50	.32 H	35.00	.095	30.50	.24	32.50
L032	.78	25.00	1.14	12.50	.02	28.50	.27	27.50	.09	28.00	.22	26.50
L033	.856	35.00	1.290	35.00	.015	8.50	.258	24.50	.095	30.50	.231	31.00
L045	.8	31.00	1.2	30.50	.005T	8.50	.25	20.50	.08	15.50	.21	22.00
L046	.770	19.50	1.18	27.00	.004	5.00	.279	29.50	.070	4.00	.241	34.00
L048	.95 VH	38.00	1.26	33.00	.009	16.50	.31	34.00	.083	23.50	.26	35.00
L049	.73	3.50	1.08	1.00	.006	13.00	.21	2.00	.08	15.50	.18	2.00
L050	.75	9.50	1.16	19.00	.05W	0.00	.26	26.00	.09	28.00	.22	26.50
L057	.94 H	37.00	1.16	19.00	.015	8.50	.34 H	36.00	.10	34.00	.22	26.50
L058	.75	9.50	1.17	22.50	.01	21.50	.25	20.50	.09	28.00	.19	3.50
L060	.76	16.50	1.40 H	37.00	.02T	28.50	.35 VH	37.00	.10	34.00	.27 H	36.00
L061	.77	19.50	1.13	10.00	.01	21.50		0.00		0.00		0.00
L062	.717	2.00	1.18	27.00	.008	15.00	.232	11.00	.062	1.00	.191	5.00
L063	.75	9.50	1.1	4.50	.006	13.00	.25	20.50	.085	25.50	.20	13.00
L064	.76	16.50	1.1	4.50	.015	26.00	.22	3.00	.077	10.50	.20	13.00
L066	.799	30.00	1.17	22.50	.008W	0.00	.245	17.50	.082	22.00	.224	29.00
MEDIAN CONC.	.770		1.160		.009		.250		.080		.206	

PARAMETER: 07092 NITRATE + NITRITE MG N/L

84/06/26

SAMPLE	7		8		9		10	
LAB NO	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK	REPORTED VALUE	RANK
L002	.098	4.00	.285	9.00	.428	8.00	.027	32.00
L003	.105	14.00	.30	20.50	.44	18.00	.045	26.00
L004	.14	34.00	.32	27.50	.47	28.00	.06	28.50
L005	.10	8.50	.30	20.50	.43	11.00	.03	17.50
L006	.931 VH	36.00	.246	2.00	.449	21.00	.063	30.00
L007	.1T	8.50	.3	20.50	.5	32.50	0.	1.00
L009	.12	29.50	.29	13.50	.41	5.00	.03	17.50
L010	.108	16.00	.325	29.00	.512 H	35.00	.029	14.00
L011A	.103	13.00	.280	6.00	.392	3.00	.050W	0.00
L011B	.100	8.50	.286	10.00	.439	16.00	.018	5.00
L013	.11	20.50	.28	6.00	.43	11.00	.03	17.50
L014	.106	15.00	.270	3.50	.434	14.00	.021	10.00
L019	.113	26.50	.303	25.00	.454	24.00	.025	13.00
L020A	.11	20.50	.29	13.50	.44	18.00	.09	31.00
L020B	.13	32.50	.33	30.00	.46	26.00	.02	7.50
L021	1.16 VH	37.00	.32	27.50	.43	30.00	.01W	0.00
L022	.097	3.00	.29	13.50	.45	22.50	.022	11.00
L023	.11	20.50	.30	20.50	.46	26.00	.05	27.00
L024	.11	20.50	.29	13.50	.44	18.00	.03	17.50
L027	.100	8.50	.300	20.50	.425	7.00	.020	7.50
L029	.113	26.50	.309	26.00	.442	20.00	.032	21.50
L030	.10	8.50	.27	3.50	.40	4.00	.02	7.50
L031	.10	8.50	.38 H	36.00	.60 VH	37.00	.030	17.50
L032	.11	20.50	.30	20.50	.45	22.50	.04	24.50
L033	.122	31.00	.346	32.00	.456	31.00	.040	24.50
L045	.11	20.50	.30	20.50	.43	11.00	.03	17.50
L046	.090	2.00	.338	31.00	.504 H	34.00	.032	21.50
L048	.111	25.00	.36	34.50	.50	32.50	.024	12.00
L049	.10	8.50	.23 L	1.00	.35 L	2.00	.02	7.50
L050	.12	29.50	.30	20.50	.53 VH	36.00	.05W	0.00
L057	.13	32.50	.43 VH	37.00	.30 VL	1.00	.2W	0.00
L058	.11	20.50	.29	13.50	.42	6.00	.01	3.00
L060	.16	35.00	.36	34.50	.46	26.00	.06	28.50
L061		0.00		0.00		0.00		0.00
L062	.086	1.00	.281	8.00	.436	15.00	.005	2.00
L063	.11	20.50	.29	13.50	.43	11.00	.035	23.00
L064	.10	8.50	.28	6.00	.43	11.00	.016	4.00
L066	.119	28.00	.349	33.00	.481	29.00	.029W	0.00
MEDIAN CONC.	.110		.300		.440		.030	

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L002	190.50	19.050	10	VHVH		
L003	147.00	14.700	10			07112
L004	297.00	29.700	10			AUTO TECHNICON ANA
L005	145.50	16.167	9			AUTOANALYZER
L006	186.50	18.650	10	HLVH		IC
L007	175.00	17.500	10			
L009	148.00	14.800	10			CD-CU REDUCTION CO
L010	174.00	17.400	10	H		IC
L011A	88.00	11.000	8			NON IC
L011B	127.50	12.750	10			IC
L013	124.50	12.450	10			AUTOANALYSER
L014	103.50	10.350	10			IC
L019	220.00	22.000	10			CAD.RA DIAZ
L020A	195.00	19.500	10			IC
L020B	235.00	26.111	9		BIASED HIGH	IC
L021	272.50	30.278	9	HHHVH		
L022	164.50	16.450	10	VH		AUTO CADMIUM REDUC
L023	187.50	20.833	9			
L024	163.00	16.300	10			
L027	100.00	10.000	10			CD.-REDU.
L029	243.50	24.350	10		BIASED LOW	COLORIMETRIC
L030	85.00	8.500	10			
L031	225.00	22.500	10	HHVH		
L032	236.00	23.600	10			AUTO CD REDN
L033	283.00	28.300	10			AUTO CD-REDUCTION
L045	197.50	19.750	10			AUTOANALZER
L046	207.50	20.750	10	H		TECHNICON
L048	284.00	28.400	10	VH		HYDRAZINE-CUSO4
L049	56.00	5.600	10	LL	BIASED LOW	IC
L050	195.00	24.375	8	VH		IC/COLORIMETRY
L057	231.50	25.722	9	HHVHVL		IC
L058	148.50	14.850	10		BIASED HIGH	IC
L060	313.00	31.300	10	HVHH	INSUFFICIENT DATA	TECHNICON AAII
L061	51.00	17.000	3		BIASED LOW	HYDRAZINE REDN
L062	87.00	8.700	10			CD-REDUCTION
L063	154.00	15.400	10			IC (DIONEX 10)
L064	103.00	10.300	10			IC
L066	211.00	26.375	8			
OVEPALL AVERAGE RANK IS		18.663				

NITRATE + NITRITE

LAB NO.	TOTAL RANK	AVERAGE RANK	NO. OF SAMPLES RANKED	SUMMARY OF FLAGGING		METHOD CODING
L049	56.00	5.600	10	LL	BIASED LOW	HYDRAZINE-CUSO4
L030	85.00	8.500	10		BIASED LOW	COLORIMETRIC
L062	87.00	8.700	10		BIASED LOW	HYDRAZINE REDN
L027	100.00	10.000	10			IC (DIONEX 10)
L064	103.00	10.300	10			AUTOANALYSER
L014	103.50	10.350	10			IC
L011A	88.00	11.000	8			IC
L013	124.50	12.450	10			NON IC
L011B	127.50	12.750	10			
L003	147.00	14.700	10			IC
L009	148.00	14.800	10			CD-REDUCTION
L058	148.50	14.850	10			AUTO TECHNICON ANA
L063	154.00	15.400	10			
L005	145.50	16.167	9			
L024	163.00	16.300	10			TECHNICON AAII
L022	164.50	16.450	10	VH	INSUFFICIENT DATA	CD-CU REDUCTION CO
L061	51.00	17.000	3			IC
L010	174.00	17.400	10	H		AUTOANALYZER
L007	175.00	17.500	10			
L006	186.50	18.650	10	HLVH		CAD.RA DIAZ
L002	190.50	19.050	10	VHVH		AUTO CD-REDUCTION
L020A	195.00	19.500	10			AUTOANALZER
L045	197.50	19.750	10			AUTO CADMIUM REDUC
L046	207.50	20.750	10	H		IC
L023	197.50	20.833	9			
L019	220.00	22.000	10			CD.-REDU.
L031	225.00	22.500	10	HHVH		IC
L032	236.00	23.600	10			IC/COLORIMETRY
L029	243.50	24.350	10			IC
L050	195.00	24.375	8	VH		IC
L057	231.50	25.722	9	HHVHVL		AUTO CD REDN
L020B	235.00	26.111	9			TECHNICON
L066	211.00	26.375	8			07112
L033	283.00	28.300	10			
L048	284.00	28.400	10	VH		
L004	297.00	29.700	10			
L021	272.50	30.278	9	HHHVH	BIASED HIGH	IC
L060	313.00	31.300	10	HVHH	BIASED HIGH	IC

OVERALL AVERAGE RANK IS 18.663

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APPENDIX II: LABORATORY APPRAISALS

Attachment 1

July 2, 1984

LAB APPRAISAL

LRTAP INTERLAB STUDY NO. 6

Your laboratory number is LO02

CALCIUM:	Satisfactory
MAGNESIUM:	Flagged very high on sample 3
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	No Results Reported
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	No Results Reported
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	No Results Reported
TOTAL ALKALINITY:	Satisfactory
GRAN TITRATION ALKALINITY:	No Results Reported
pH:	Flagged high on sample 9, and very high on sample 8.
SPECIFIC CONDUCTIVITY:	Satisfactory except for a flagged result on sample 1
COLOUR:	Samples 4 and 6 are flagged low
REACTIVE SILICA:	Satisfactory except for a high result in sample 2.
NITRATE + NITRITE:	Satisfactory

LRTAP INTERLAB STUDY NO. 6

Attachment 1

July 2, 1984

LAB APPRAISAL

Your laboratory number is L003

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory except for a low flag on sample 1.
POTASSIUM:	Flagged low on samples 7 and 8. Ranking indicates a low bias.
CHLORIDE I.C.:	No Results Reported
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	Flagged high on samples 1 and 2.
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	No Results Reported
TOTAL ALKALINITY:	Satisfactory on the five results ranked
GRAN TITRATION ALKALINITY:	Flagged very high on sample 10.
pH:	Flagged low on samples 5 and 6, flagged very low on samples 4 and 8, Flagged very high on sample 10.
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Samples 4 and 6 are flagged low, however there is in sufficient data to access bias.
REACTIVE SILICA:	Flagged high on samples 4,5,and 9. Flagged very high on sample. 6,7, and 8. Ranking indicates a high bias.
NITRATE + NITRITE:	Satisfactory

*Beware of significant figures.

LRTAP INTERLAB STUDY NO. 6

Attachment 1

July 2, 1984

LAB APPRAISAL

Your laboratory number is L004

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory
POTASSIUM:	Flagged low on samples 7 and 8. Ranking indicates a low bias.
CHLORIDE I.C.:	No Results Reported
CHLORIDE NON I.C.:	Flagged very low on sample 10. This may suggest the measurement process is out of control.
SULPHATE I.C.:	No Results Reported.
SULPHATE NON I.C.:	Flagged very high on sample 10, this suggests that the measurement process is out of control.
ACIDITY:	No Results Reported.
TOTAL ALKALINITY:	Of the five results reported, none were flagged, however ranking indicates low bias.
GRAN TITRATION ALKALINITY:	Flagged very low on sample 4,5,6,8 and 9 flagged very high on sample 1.
pH:	flagged high on sample 8 and very high on sample 10.
SPECIFIC CONDUCTIVITY:	Eight samples are flagged very low, one sample flagged low. Ranking indicates a low bias.
COLOUR:	Sample 1 is flagged high, samples 2,7,8 are flagged very high and sample 6 is flagged low; results appear erratic.
REACTIVE SILICA:	No Results Reported
NITRATE + NITRITE:	Satisfactory

LRTAP INTERLAB STUDY NO. 6

Attachment 1
July 2, 1984

LAB APPRAISAL

Your laboratory number is LOO5

CALCIUM:	No Results Reported
MAGNESIUM:	No Results Reported
SODIUM:	No Results Reported
POTASSIUM:	No Results Reported
CHLORIDE I.C.:	No Results Reported
CHLORIDE NON I.C.:	No Results Reported
SULPHATE I.C.:	No Results Reported
SULPHATE NON I.C.:	No Results Reported
ACIDITY:	The three results reported are flagged very low. (A reporting error is possible).
TOTAL ALKALINITY:	Flagged low on sample 10, flagged very low on samples 6, and 8.
GRAN TITRATION ALKALINITY:	No Results Reported
pH:	Flagged high on samples 1 and 3. Flagged very high on sample 7. (Measurement process may be out of control).
SPECIFIC CONDUCTIVITY:	Flagged high on sample 5 and very high on sample 6.
COLOUR:	Satisfactory on the seven results ranked.
REACTIVE SILICA:	No Results Reported
NITRATE + NITRITE:	Satisfactory

Attachment 1

LRTAP INTERLAB STUDY NO.6

July 2, 1984

LAB APPRAISAL

Your laboratory number is L006

CALCIUM:	Flagged high on sample 6, and very high on samples 1,2,3,7,8, and 9. Ranking indicates a high bias.
MAGNESIUM:	Nine out of the ten samples are flagged very high. Ranking indicates a high bias.
SODIUM:	Flagged high on sample 10 and very high on samples 1,2,4,5,6,7,8,9. Ranking indicates a high bias.
POTASSIUM:	Flagged high on sample 7 and very high on samples 1,2,6 and 9. Ranking indicates a high bias.
CHLORIDE I.C.:	Satisfactory
CHLORIDE NON I.C.:	Flagged low on sample 9
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	Although no results are flagged, ranking indicates a low bias.
ACIDITY:	No Results Reported
TOTAL ALKALINITY:	Flagged low on samples 3,7 and 10.
GRAN TITRATION ALKALINITY:	No Results Reported
pH:	Flagged low on sample 6 and on sample 4 flagged very low
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	No Results Reported
REACTIVE SILICA:	Although no results are flagged, however ranking indiates a low bias.
NITRATE + NITRITE:	Flagged low on sample 4, flagged high on sample 3 and very high on sample 7. (Reporting error is possible on #7.

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is L007

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory
POTASSIUM:	Flagged high on sample 10
CHLORIDE I.C.:	Satisfactory
CHLORIDE NON I.C.:	No Results Reported
SULPHATE I.C.:	Although no results are flagged, ranking indicates a low bias.
SULPHATE NON I.C.:	No Results Reported
ACIDITY:	No Results Reported
TOTAL ALKALINITY:	No Results Reported
GRAN TITRATION ALKALINITY:	No Results Reported
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	No Results Reported
REACTIVE SILICA:	No Results Reported
NITRATE + NITRITE:	Satisfactory

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is L009

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory, except for a low flag on sample 7.
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Flagged low on sample 9. Ranking indicates the data set is bias low.
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	Samples 9 and 10 are flagged very low.
SULPHATE NON I.C.:	No Results Reported
ACIDITY:	No Results Reported
TOTAL ALKALINITY:	No Results Reported
GRAN TITRATION ALKALINITY:	No Results Reported
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	No Results Reported
REACTIVE SILICA:	No Results Reported
NITRATE + NITRITE:	Satisfactory

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is L010

CALCIUM:	Samples 4,5,6,7,8,9,10, are all flagged very high, and two results flagged high. Ranking indicates a bias high.
MAGNESIUM:	Six results flagged very high, and two results flagged high. Ranking indicates a bias high.
SODIUM:	Flagged very high on samples 9 and 10.
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	No Results Reported
CHLORIDE NON I.C.:	Although no results are flagged, ranking indicates a low bias.
SULPHATE I.C.:	No Results Reported
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	Flagged high on sample 9 and very high on sample 8.
TOTAL ALKALINITY:	Flagged low on samples 4 and 5. Ranking indicates a low bias.
GRAN TITRATION ALKALINITY:	No Results Reported
pH:	Flagged very low on sample 6, flagged low on sample 5, 8 and 10. Ranking indicates a low bias.
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Flagged low on samples 4 and 6
REACTIVE SILICA:	Eight results are flagged high or very high. Ranking indicates a high bias.
NITRATE + NITRITE:	Satisfactory, except for a high flag on sample 9.

LAB APPRAISAL

Your laboratory number is LO11

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Flagged very high on sample 10
POTASSIUM:	Flagged very high on sample 10
CHLORIDE I.C.:	Flagged low on sample 9
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	Satisfactory, except for a low flag on sample 9.
TOTAL ALKALINITY:	Satisfactory, except for a low flag on sample 2.
GRAN TITRATION ALKALINITY:	No Results Reported.
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Flagged very low on sample 1.
COLOUR:	No Results Reported
REACTIVE SILICA:	No Results Reported
NITRATE + NITRITE:	Satisfactory on both the I.C. and Non I.C. procedures.

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is LO13

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Satisfactory
CHLORIDE NON I.C.:	No Results Reported
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Reported
ACIDITY:	No Results Reported
TOTAL ALKALINITY:	No Results Reported
GRAN TITRATION ALKALINITY:	No Results Reported
pH:	Flagged high on sample 9 and very high on sample 6.
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	No Results Reported
REACTIVE SILICA:	No Results Reported
NITRATE + NITRITE:	Satisfactory

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is LO14

CALCIUM:	Flagged low on samples 2 and 6. Flagged very low on sample 4. Flagged high on samples 1,2 and 8.
MAGNESIUM:	Flagged low on sample 10. Flagged high on sample land 2. Flagged very high on sample 5,6, and 7.
SODIUM:	Flagged high on sampel 2.
POTASSIUM:	Flagged high on samples 1 and 6. Flagged very high on sample 2
CHLORIDE I.C.:	Flagged very high on sample 4.
CHLORIDE NON I.C.:	No Results Reported
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Reported
ACIDITY:	No Results Reported
TOTAL ALKALINITY:	No Results Reported
GRAN TITRATION ALKALINITY:	Satisfactory
pH:	Flagged low on samples 1 and 2.
SPECIFIC CONDUCTIVITY:	Satisfactory, except for a high flag on sample 1.
COLOUR:	No Results Reported
REACTIVE SILICA:	Satisfactory
NITRATE + NITRITE:	Satisfactory

Attachment 1

LRTAP INTERLAB STUDY NO.6

July 2, 1984

LAB APPRAISAL

Your laboratory number is LO16

CALCIUM:	Satisfactory, except for a low result on sample 9.
MAGNESIUM:	Flagged very low on sample 4, and low on sample 2 and 5. Ranking ihdicates a lwo bias.
SODIUM:	Flagged low on sample 8 and flagged very lwo on sample 9. Ranking indicates a low bias.
POTASSIUM:	Although no results are flagged, ranking indicates a low bias.
CHLORIDE I.C.:	No Results Reported
CHLORIDE NON I.C.:	Although no results are flagged, ranking indicates a low bias.
SULPHATE I.C.:	No Results Reported
SULPHATE NON I.C.:	Flagged low on sample 9
ACIDITY:	Satisfactory
TOTAL ALKALINITY:	Flagged lwo on samples 3,7, and 10.
GRAN TITRATION ALKALINITY:	No Results Reported
pH:	Satisfactory, except for a high flag on sample 10.
SPECIFIC CONDUCTIVITY:	No Results Reported
COLOUR:	No Results Reported
REACTIVE SILICA:	No Results Reported
NITRATE + NITRITE:	No Results Reported

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is LO19

CALCIUM:	Flagged high on sample 6, flagged very high on sample 5.
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Flagged low on sample 8.
CHLORIDE NON I.C.:	No Results Reported
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Reported
ACIDITY:	No Results Reported
TOTAL ALKALINITY:	No Results Reported
GRAN TITRATION ALKALINITY:	Satisfactory, except for a low flag on sample 3.
pH:	No Results Reported
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	No Results Reported
REACTIVE SILICA:	No Results Reported
NITRATE + NITRITE:	Satisfactory

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is LO20

CALCIUM:	Satisfactory except for a low flag on sample 2.
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory by flame; satisfactory by I.C. except for a high flag on sample 10.
POTASSIUM:	Satisfactory by both methods.
CHLORIDE I.C.:	Satisfactory
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	Although no results are flagged, ranking indicates a high bias.
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	Flagged very high on samples 5,6 and 7. Ranking indicates a high bias.
TOTAL ALKALINITY:	No Results Reported
GRAN TITRATION ALKALINITY:	Satisfactory, except for a high flag on sample 7.
pH:	Satisfactory, except for a low flag on sample 8.
SPECIFIC CONDUCTIVITY:	No Results Reported
COLOUR:	No Results Reported
REACTIVE SILICA:	Satisfactory, except for a low flag on sample 2.
NITRATE + NITRITE:	Satisfactory on both methods reported

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6 LAB APPRAISAL

Your laboratory number is LO21

CALCIUM:	Flagged very low on sample 6 .
MAGNESIUM:	Eight results flagged very high, ranking indicates a bias high .
SODIUM:	Satisfactory
POTASSIUM:	Flagged high on samples 5 and 9 .
CHLORIDE I.C.:	Flagged very high on samples 3,4, and 10 .
CHLORIDE NON I.C.:	No Results Reported
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Reported
ACIDITY:	Satisfactory on the four results ranked.
TOTAL ALKALINITY:	No Results Reported
GRAN TITRATION ALKALINITY:	Of the four results reported two are flagged very high and one is flagged very low.
pH:	Flagged high on sample 8. Ranking indicates a low bias.
SPECIFIC CONDUCTIVITY:	Flagged low on samples 4 and 5 a low bias.
COLOUR:	No Results Reported
REACTIVE SILICA:	No Results Reported
NITRATE + NITRITE:	Flagged high on samples 1,2 and 3; flagged very high on sample 7. Ranking indicates a high bias.

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is LO22

CALCIUM:	Satisfactory
MAGNESIUM:	Although no results are flagged, ranking indicates a low bias.
SODIUM:	Although no results are flagged, ranking indicates a low bias.
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Flagged very high on sample 9
CHLORIDE NON I.C.:	No results reported
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Reported
ACIDITY:	Flagged high on samples 3 and 6. Flagged very high on sample 5
TOTAL ALKALINITY:	Flagged low on sample 7. Ranking indicates a low bias.
GRAN TITRATION ALKALINITY:	No Results Reported
pH:	Flagged low on samples 1,3,5,6 and 7. Flagged very low on sample 4. Flagged very high on sample 2. Ranking indicates a low bias.
SPECIFIC CONDUCTIVITY:	Flagged very low on sample 6,7 and 8; flagged high on sample 1; flagged very high on samples 2,3 and 4. Results are somewhat erratic.
COLOUR:	Flagged low on samples 1 and 4, flagged very low on sample 10. Ranking indicates a low bias.
REACTIVE SILICA:	Flagged very low on samples 4,5,6, and 7. Flagged very high on sample 8. and very high on samples 1,2, and 3. These results are very erratic.
NITRATE + NITRITE:	Flagged very high on sample 2

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6 LAB APPRAISAL

Your laboratory number is LO23

CALCIUM:	Flagged very high on sample land 7
MAGNESIUM:	Samples 2,4,5,6, and 8 are flagged very high. Ranking indicates a high bias.
SODIUM:	Flagged very high on sample 1 and 7. If this is not a reporting error, then the measurement process is out of control.
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	No Results Recorded
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	No Results Recorded
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	Satisfactory
TOTAL ALKALINITY:	Satisfactory
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	Flagged low on sample 9 and very high on sample 10
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Satisfactory except for low flag on sample 6
REACTIVE SILICA:	Satisfactory
NITRATE + NITRITE:	Satisfactory

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is LO24

CALCIUM:	Flagged high on samples 5 and 6.
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	No Results Reported
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Reported
ACIDITY:	No Results Reported
TOTAL ALKALINITY:	Satisfactory
GRAN TITRATION ALKALINITY:	Satisfactory
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Flagged low on samples 3, high flag on sample 4, and flagged very high on samples 5 and 7.
REACTIVE SILICA:	Satisfactory
NITRATE + NITRITE:	Satisfactory

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is LO25

CALCIUM:	Flagged high on sample 5, very high on sample 2 and very low on sample 10
MAGNESIUM:	Flagged very low on samples 5 and 10, flagged high on sample 2
SODIUM:	Satisfactory except for a low flag on sample 10.
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Flagged very low on sample 10.
CHLORIDE NON I.C.:	No Results Reported
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Reported
ACIDITY:	Although no results are flagged, ranking indicates a low bias.
TOTAL ALKALINITY:	No Results Reported
GRAN TITRATION ALKALINITY:	No Results Reported
pH:	Satisfactory except for a high flag on sample 10.
SPECIFIC CONDUCTIVITY:	Satisfactory, except for a flag on sample 2
COLOUR:	No Results Recorded
REACTIVE SILICA:	No Results Recorded
NITRATE + NITRITE:	No Results Recorded

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is LO27

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	No Results Recorded
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Recorded
ACIDITY:	No Results Recorded
TOTAL ALKALINITY:	Although no results are flagged, ranking indicates a high bias.
GRAN TITRATION ALKALINITY:	Flagged very high on sample 3
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Flagged low on samples 1 and 3
REACTIVE SILICA:	Satisfactory
NITRATE + NITRITE:	Satisfactory

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is LO28

CALCIUM:	No Results Recorded
MAGNESIUM:	No Results Recorded
SODIUM:	No Results Recorded
POTASSIUM:	No Results Recorded
CHLORIDE I.C.:	All results are flagged very high, ranking indicates a high bias.
CHLORIDE NON I.C.:	No Results Recorded
SULPHATE I.C.:	Flagged high on sample 8 and very high on sample 3. Ranking indicates a high bias.
SULPHATE NON I.C.:	No Results Recorded
ACIDITY:	No Results Recorded
TOTAL ALKALINITY:	No Results Recorded
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	No Results Recorded
SPECIFIC CONDUCTIVITY:	No Results Recorded
COLOUR:	No Results Recorded
REACTIVE SILICA:	No Results Recorded
NITRATE + NITRITE:	No Results Recorded

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is LO29

CALCIUM:	Flagged low on sample 1,6 and 8
MAGNESIUM:	Satisfactory
SODIUM:	Although no results are flagged, ranking indicates a low bias.
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Satisfactory
CHLORIDE NON I.C.:	No Results Recorded
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Recorded
ACIDITY:	Satisfactory, except for a low result on sample 9.
TOTAL ALKALINITY:	Satisfactory
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory, except for a flag on sample 1.
COLOUR:	No Results Recorded
REACTIVE SILICA:	Satisfactory, except for a low flag on sample 5.
NITRATE + NITRITE:	Satisfactory

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is LO30

CALCIUM:	No Results Recorded
MAGNESIUM:	"
SODIUM:	"
POTASSIUM:	"
CHLORIDE I.C.:	"
CHLORIDE NON I.C.:	"
SULPHATE I.C.:	"
SULPHATE NON I.C.:	"
ACIDITY:	Satisfactory
TOTAL ALKALINITY:	Satisfactory
GRAN TITRATION ALKALINITY:	Satisfactory
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Satisfactory
REACTIVE SILICA:	No Results Recorded
NITRATE + NITRITE:	Although no results are flagged, ranking indicates a low bias.

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is LO31

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	No Results Recorded
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	No Results Recorded
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	No Results Recorded
TOTAL ALKALINITY:	Flagged low on samples 3 and 7
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Flagged low on samples 1 and 4. Ranking indicates a low bias
REACTIVE SILICA:	Satisfactory
NITRATE + NITRITE:	Flagged high on samples 4 and 8. Flagged very high on sample 9.

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is LO32

CALCIUM:	Flagged very low on sample 6, low on samples 9 and 10. flagged high on sample 3 and very high on sample 7. Imprecise!
MAGNESIUM:	Flagged high on sample 3 and 7
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory except for a high flag on sample 1.
CHLORIDE I.C.:	Satisfactory
CHLORIDE NON I.C.:	No Results Recorded
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Recorded
ACIDITY:	Flagged low on samples 4 and 5, flagged very low on samples 8 and 9. Ranking indicates a low bias.
TOTAL ALKALINITY:	Satisfactory
GRAN TITRATION ALKALINITY:	Satisfactory
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Flagged very high on sample 5
REACTIVE SILICA:	Flagged very low on samples 3 and 10. Flagged very high on samples 4,5,6,7,8 and 9. These results appear erratic.
NITRATE + NITRITE:	Satisfactory

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is LO33

CALCIUM:	Flagged very lwo on samples 1,2,6, and 7. Flagged high on sample 8, and very high on sample 9.
MAGNESIUM:	Flagged high on samples 1 and 8, flagged very high on sample 5.
SODIUM:	Only five results were ranked, and the high result on sample 6 suggests the analytical system may be out of control.
POTASSIUM:	Flagged very high on samples 3,6 and 7.
CHLORIDE I.C.:	No Results Recorded
CHLORIDE NON I.C.:	Flagged very high on sample 3, and 5. This suggests the measurement system is out of control.
SULPHATE I.C.:	No Results Recorded
SULPHATE NON I.C.:	Flagged high on sample 7
ACIDITY:	No Results Recorded
TOTAL ALKALINITY:	Satisfactory, except for a low flag on sample 6
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	Flagged very low on sample 10.
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Flagged low on samples 1,3 and 10; flagged high on sample 5
REACTIVE SILICA:	Satisfactory on the six ranked results
NITRATE + NITRITE:	Satisfactory

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is L045

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory
POTASSIUM:	Although no results are flagged, ranking indicates a low bias.
CHLORIDE I.C.:	No Results Reported
CHLORIDE NON I.C.:	Although no results are flagged, ranking indicates a low bias.
SULPHATE I.C.:	No Results Recorded
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	Satisfactory on the five results reported.
TOTAL ALKALINITY:	Satisfactory, except for a low flag on sample 3
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Flagged high on sample 8; ranking indicates a high bias.
COLOUR:	Flagged high on samples 6 and 8; flagged very high on samples 2,7,9 and 10. Ranking indicates a high bias.
REACTIVE SILICA:	Although no results are flagged, ranking indicates a low bias
NITRATE + NITRITE:	Satisfactory

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is L046

CALCIUM:	Flagged very low on sample 4 and high on sample 6. The measurement system may be out of control.
MAGNESIUM:	Satisfactory
SODIUM:	Flagged high on samples 1,2,3 and 6; flagged high on sample 6. Ranking indicates a high bias.
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	No Results Recorded
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	No Results Recorded
SULPHATE NON I.C.:	Flagged very low on samples 9 and 10. Ranking indicates a low bias.
ACIDITY:	Satisfactory, except for a high flag on sample 4.
TOTAL ALKALINITY:	Flagged very high on sample 7.
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	Flagged very low on sample 1.
SPECIFIC CONDUCTIVITY:	Although no results are flagged, ranking indicates a high bias.
COLOUR:	No Results Recorded
REACTIVE SILICA:	Flagged very low on samples 2 and 7. Flagged low on samples 1 and 5. Ranking indicates a low bias.
NITRATE + NITRITE:	Satisfactory, except fpr a high flag on sample 9.

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6 LAB APPRAISAL

Your laboratory number is L048

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Flagged high on samples 2 and 8
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Flagged high on samples 1,2,5 and very high on samples 6 and 7.
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	No Results Recorded
TOTAL ALKALINITY:	Flagged high on sample 4 and very high on sample 2,3,5,6,7 and 10. Ranking indicates a high bias.
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	No Results Recorded
COLOUR:	No Results Recorded
REACTIVE SILICA:	Satisfactory
NITRATE + NITRITE:	Flagged very high on sample 1.

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is LO49

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Although no results are flagged, ranking indicates a high bias.
POTASSIUM:	Flagged high on sample 10. Ranking indicates a high bias.
CHLORIDE I.C.:	No Results Recorded
CHLORIDE NON I.C.:	Satisfactory
SULPHATE I.C.:	No Results Recorded
SULPHATE NON I.C.:	Flagged very high on sample 3.
ACIDITY:	Satisfactory on the two results reported.
TOTAL ALKALINITY:	Satisfactory
GRAN TITRATION ALKALINITY:	No results recorded
pH:	Satisfactory, except for a low flag on sample 2
SPECIFIC CONDUCTIVITY:	Flagged high on samples 4,5, 8, and 9. Sample 1 and 6 are flagged very high. Ranking indicates high bias.
COLOUR:	Sample 4 flagged very low
REACTIVE SILICA:	Flagged high on samples 4,6, and 9. Flagged very high on samples 5,7. Ranking indicates a high bias.
NITRATE + NITRITE:	Flagged low on samples 8 and 9, ranking indicates low bias.

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6 LAB APPRAISAL

Your laboratory number is LO50

CALCIUM:	No Results Recorded
MAGNESIUM:	"
SODIUM:	"
POTASSIUM:	"
CHLORIDE I.C.:	Satisfactory
CHLORIDE NON I.C.:	No Results Recorded
SULPHATE I.C.:	Although no results are flagged, ranking indicates a low bias.
SULPHATE NON I.C.:	No Results Recorded
ACIDITY:	"
TOTAL ALKALINITY:	"
GRAN TITRATION ALKALINITY:	"
pH:	Flagged low on sample 2, flagged very low on samples land 3. Ranking indicates a low bias.
SPECIFIC CONDUCTIVITY:	No Results Recorded
COLOUR:	"
REACTIVE SILICA:	"
NITRATE + NITRITE:	Flagged very high on sample 9.

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6 LAB APPRAISAL

Your laboratory number is L057

CALCIUM:	Flagged low on sample 8, high on sample 7, and very high on sample 6
MAGNESIUM:	Flagged low on sample 5 and flagged very high on sample land 8
SODIUM:	Satisfactory
POTASSIUM:	Flagged low on sample 6, ranking indicates a low bias.
CHLORIDE I.C.:	No Results Recorded
CHLORIDE NON I.C.:	''
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Recorded
ACIDITY:	Satisfactory except for a high flag on samples 4 and 6
TOTAL ALKALINITY:	Satisfactory
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory, except for a flag on sample 1.
COLOUR:	Satisfactory on the four results ranked
REACTIVE SILICA:	No Results Ranked
NITRATE + NITRITE:	Flagged high on sample 1 and 4 Flagged very low on sample 9, and flagged very high on sample 8

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is L058

CALCIUM:	Flagged high on sample 5 and very high on sample 10.
MAGNESIUM:	Flagged high on sample 2,8 and 10. Flagged very high on sample 5
SODIUM:	Flagged high on sample 5, and very high on samples 4 and 10.
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Satisfactory
CHLORIDE NON I.C.:	No Results Recorded
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Recorded
ACIDITY:	''
TOTAL ALKALINITY:	''
GRAN TITRATION ALKALINITY:	Flagged low on sample 7 and very low on sample 8 (Reporting Error) on sample 8
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Satisfactory on the six results ranked.
REACTIVE SILICA:	No Results Recorded
NITRATE + NITRITE:	Satisfactory

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6 LAB APPRAISAL

Your laboratory number is LO60

CALCIUM:	Flagged very low on samples 1 and 2; also flagged low on samples 7 and 8
MAGNESIUM:	Flagged high on sample 9 and 10; flagged very high on 3 and 8. Ranking indicates a high bias.
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	No Results Recorded
CHLORIDE NON I.C.:	''
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Recorded
ACIDITY:	Flagged high on samples 4 and 7, flagged very high on samples 2,3 and 5. Ranking indicates a high bias.
TOTAL ALKALINITY:	No Results Recorded
GRAN TITRATION ALKALINITY:	''
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	No Results Recorded
COLOUR:	''
REACTIVE SILICA:	Satisfactory, except for a low result on sample 2.
NITRATE + NITRITE:	Flagged high on samples 2, 6. Flagged very high on sample 4. Rankings indicates a high bias

Attachment 1

July 2, 1984

LAB APPRAISAL

LRTAP INTERLAB STUDY NO. 6

Your laboratory number is LO61

CALCIUM:	Satisfactory on the three results reported
MAGNESIUM:	Satisfactory on the three results reported
SODIUM:	Satisfactory on the three results reported
POTASSIUM:	Satisfactory on the three results reported
CHLORIDE I.C.:	Satisfactory on the three results reported
CHLORIDE NON I.C.:	Satisfactory on the three results reported
SULPHATE I.C.:	Satisfactory on the three results reported
SULPHATE NON I.C.:	Satisfactory on the three results reported
ACIDITY:	No Results Recorded
TOTAL ALKALINITY:	,,
GRAN TITRATION ALKALINITY:	,,
pH:	Satisfactory on the three results reported
SPECIFIC CONDUCTIVITY:	Satisfactory on the three results reported
COLOUR:	No Results Recorded
REACTIVE SILICA:	''
NITRATE + NITRITE:	Satisfactory on the three results reported

*Insufficient data reported to access bias on all parametres.

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6

LAB APPRAISAL

Your laboratory number is LO62

CALCIUM:	Satisfactory
MAGNESIUM:	Flagged low on samples 8 and 9
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Satisfactory
CHLORIDE NON I.C.:	Although no results are flagged, ranking indicates a high bias.
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	Flagged high on sample 1, flagged very high on sample 3,5, 8 and 10. Ranking indicates a high bias.
TOTAL ALKALINITY:	Satisfactory
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	Satisfactory except for a very high flag on sample 2
REACTIVE SILICA:	Satisfactory
NITRATE + NITRITE:	Although no results are flagged, ranking indicates a low bias.

Attachment 1

LRTAP INTERLAB STUDY NO. 6

July 2, 1984

LAB APPRAISAL

Your laboratory number is LO63

CALCIUM:	Flagged low on samples 2 and 8. Ranking indicates a low bias.
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Flagged very high on sample 1.
CHLORIDE NON I.C.:	Satisfactory, except for a high flag on sample 1.
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	Satisfactory
ACIDITY:	Flagged low on samples 4 and 8, flagged very low on sample 9, Flagged very high on sample 7 Ranking indicates a low bias.
TOTAL ALKALINITY:	Satisfactory
GRAN TITRATION ALKALINITY:	No Results Recorded
pH:	Flagged high on samples 4 and 8
SPECIFIC CONDUCTIVITY:	Satisfactory except for a high flag on sample 1.
COLOUR:	Flagged low on sample 6. Ranking indicates a low bias.
REACTIVE SILICA:	Satisfactory
NITRATE + NITRITE:	Satisfactory

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6 - LAB APPRAISAL

Your laboratory number is LO64

CALCIUM:	Satisfactory, except for a low flag on sample 8
MAGNESIUM:	Satisfactory
SODIUM:	Flagged high on sample 10, and very high on sample 9. Ranking indicates a high bias.
POTASSIUM:	Flagged low on sample10, and high on samples 1,3,4,5,6,and 8. Flagging very high on sample 9 ranking indicates a high bias.
CHLORIDE I.C.:	Flagged high on sample 10.
CHLORIDE NON I.C.:	No Results Recorded
SULPHATE I.C.:	Satisfactory
SULPHATE NON I.C.:	No Results Recorded
ACIDITY:	Flagged high on sample 6 and flagged very high on sample 4,8, and 9
TOTAL ALKALINITY:	Satisfactory on the five results ranked.
GRAN TITRATION ALKALINITY:	No Results Ranked
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Satisfactory
COLOUR:	No Results Recorded
REACTIVE SILICA:	"
NITRATE + NITRITE:	Satisfactory

Attachment 1

July 2, 1984

LRTAP INTERLAB STUDY NO. 6 LAB APPRAISAL

Your laboratory number is LO66

CALCIUM:	Satisfactory
MAGNESIUM:	Satisfactory
SODIUM:	Satisfactory
POTASSIUM:	Satisfactory
CHLORIDE I.C.:	Satisfactory
CHLORIDE NON I.C.:	No Results Recorded
SULPHATE I.C.:	Although no results are flagged, ranking indicates a high bias.
SULPHATE NON I.C.:	No Results Ranked
ACIDITY:	Flagged low on sample 8. Ranking indicates a low bias.
TOTAL ALKALINITY:	No Results Recorded
GRAN TITRATION ALKALINITY:	"
pH:	Satisfactory
SPECIFIC CONDUCTIVITY:	Flagged very high on sample 1. Ranking indicates a slight high bias.
COLOUR:	No Results Recorded
REACTIVE SILICA:	"
NITRATE + NITRITE:	Satisfactory

Piece Jointe 1

L6

2 Juillet 1984

Etats résumé des résultats

Votre Numero de laboratoire: L057

CALCIUM:	Les donées peuvent être irrégulières
MAGNESIUM:	Les donées peuvent être irrégulières
SODIUM:	Résultats satisfaisants
POTASSIUM:	une résultat faible. Le classement des résultats indique une erreur systématique négative
CHLORURE I.C.:	Aucun résultats signalé
CHLORURE NON I.C.:	''
SULFATE I.C.:	Résultats satisfaisants
SULFATE NON I.C.:	Aucun résultats signalé
ACITITE:	Résultats satisfaisants sauf dans le cas de l'échantillon 4 et 5 les élevée
ALCALINITE (TOTAL):	Résultats satisfaisants
ALCALINITE TITRATION GRAN:	''
pH:	Résultats satisfaisants
CONDUCTIVITE:	''
COULEUR:	''
SILICE REACTIVE:	Aucan résultats signale
NITRATE & NITRITE:	Les donées peuvent être irrêgulierés

Piece Jointe 1

L6

2 Juillet 1984

Etats résumé des résultats

Votre Numero de laboratoire: L058

CALCIUM:	Deux résultats élevée
MAGNESIUM:	Quatre résultats élevée
SODIUM:	Trois résultats élevée
POTASSIUM:	Résultats satisfaisants
CHLORURE I.C.:	Résultats satisfaisants
CHLORURE NON I.C.:	Aucun résultats signalé
SULFATE I.C.:	Résultats satisfants
SULFATE NON I.C.:	Aucun résultats signalé
ACITITE:	Aucun résultats signalé
ALCALINITE (TOTAL):	Aucun résultats signalé
ALCALINITE TITRATION GRAN:	Deuz résultats faibles
pH:	Résultats satisfaisants
CONDUCTIVITE:	Résultats satisfaisants
COULEUR:	Résultats satisfaisants
SILICE REACTIVE:	Aucun résultats signalé
NITRATE & NITRITE:	Résultats satisfaisants

Piece Jointe 1

L6

2 Juillet 1984

Etats résumé des résultats

Votre Numero de laboratoire: LO31

CALCIUM:	Résultats satisfaisants
MAGNESIUM:	''
SODIUM:	''
POTASSIUM:	''
CHLORURE I.C.:	Aucun résultats signalé
CHLORURE NON I.C.:	Résultats satisfaisants
SULFATE I.C.:	Aucun résultats signalé
SULFATE NON I.C.:	Résultats satisfaisants
ACITITE:	Aucun résultats signalé
ALCALINITE (TOTAL):	Deux résultats faibles
ALCALINITE TITRATION GRAN:	Aucun résultats signalé
pH:	Résultats satisfaisants
CONDUCTIVITE:	''
COULEUR:	Deux résultats faibles. Le classement des résultats indique une erreur systematique négative
SILICE REACTIVE:	Résultats satisfaisants
NITRATE & NITRITE:	Trois résultats élevée

Piece Jointe 1

2 Juillet 1984

L6

Etats résumé des résultats

Votre Numero de laboratoire: L007

CALCIUM:	Résultats satisfaisants
MAGNESIUM:	Résultats satisfaisants
SODIUM:	Résultats satisfaisants
POTASSIUM:	Une résultats élevée
CHLORURE I.C.:	Résultats satisfaisants
CHLORURE NON I.C.:	Aucun résultats signalé
SULFATE I.C.:	Le classement des résultats indique une erreur systematique
SULFATE NON I.C.:	Aucun résultats signalé
ACITITE:	''
ALCALINITE (TOTAL):	''
ALCALINITE TITRATION GRAN:	''
pH:	Résultats satisfaisants
CONDUCTIVITE:	''
COULEUR:	Aucun résultats signale
SILICE REACTIVE:	''
NITRATE & NITRITE:	Résultats satisfaisants

Piece Jointe 1

L6

2 Juillet 1984

Etats résumé des résultats

Votre Numero de laboratoire: L004

CALCIUM:	Résultats satisfaisants
MAGNESIUM:	Résultats satisfaisants
SODIUM:	Résultats satisfaisants
POTASSIUM:	Deux résultats faibles. Le classement résultats indique une erreur systematique négative
CHLORURE I.C.:	Aucun résultats signalé
CHLORURE NON I.C.:	Les donées peuvent être irreguliéres
SULFATE I.C.:	Aucun résultats signalé
SULFATE NON I.C.:	Les données peuvent être irréguliéres
ACITITE:	Aucun résultats signalé
ALCALINITE (TOTAL):	Le classement des résultats indique une erreur systématique négative.
ALCALINITE TITRATION GRAN:	Cinq résultats faibles une résultats élévee
pH:	Une résultat élevée et une Une résultat est trés élevée
CONDUCTIVITE:	Neuf résultats faibles. Le classement des résultats indique une erreur systematique négative.
COULEUR:	Les donées peuvent être irréguliéres Trois résultats est trés elevée, une résultats élevée et une résultats faibles.
SILICE REACTIVE:	Aucun résultats signalé
NITRATE & NITRITE:	Résultats satisfaisants

APPENDIX III: GLOSSARY OF TERMS

Reference: 1983 ASTM Volume 11.01 water 1, Section II, pg D4210-83

GLOSSARY OF TERMS USED IN THE EVALUATION OF INTERLABORATORY RESULTS

Satisfactory: Quite acceptable, "good results".

Erratic: A set of results for a given characteristic is deemed erratic when both high and low flags are assigned.

Out of Control: An analytical system is said to be out of control when it has demonstrated the ability to perform adequately and produces an extreme result or results. For an example, consider this set of results obtained by laboratory #3 on total phosphorus for Study #24.

Sample No.	Reported Value	Median	Difference
1	9	9.5	-.5
2	5	4.5	.5
3	2T	3	-1
4	8	8	0
5	2T	2.5	-.5
6	9	8	1
7	28	28	0
8	18	17	1
9	23	23.7	-.7
10	16	15	1
11	35	35.8	-.8
12	75	78.7	-3.8
13	58	59	-1
14	110	90	20

Given the excellent results obtained on samples 1 through 13, the result on sample 14 indicates that the analytical system was out of control.

Bias: A set of results is said to be biased when the set exhibits a tendency to be either higher or lower than some standard - the standard which has been used in the analysis of our studies thus far has been the performance of all other participating laboratories. The ranking procedure employed in testing for bias is described in W.J. Youden's paper, "Ranking Laboratories by Round-Robin Tests from Precision Measurement and Calibration, H.H. Ku, Editor, NBS Special Publication 300 - Volume 1, U.S. Government Printing Office, Washington, D.C., 1969. In this paper, Youden establishes the rationale for evaluating laboratories' performance by ranking results. In our use of the procedure there is about 1 chance in 20 of deeming a set of results biased when in fact it is not, that is, $\alpha = 0.05$.

W: A "W" code is used with a reported result when no measurement was possible due to no response of the instrument to the sample. The "W" is preceded by the smallest determinative division that can be used in the units used in reporting.

T: The "T" code is used with values between the Criterion of Detection and the "W" value. The Criterion of Detection is commonly thought of by many as the limit of detection.

Lower limit for Use of Basic Assceptable Error, Basic Acceptable Error; and Concentration Error Increment:

These terms define the acceptable difference from the median of results (target value) that is allowed without a result being

flagged either low or high. For a sample whose target value is at or below the lower limit for use of basic acceptable error the basic acceptable error is used to determine the range of acceptable deviations.

For example: Suppose that the lower limit for use of basic acceptable error has been set at 10 µg/L and the basic acceptable error is 1.0 µg/L, if a target (median) value for a sample is 5 µg/L, then any reported result within the range 5 ± 1.0 or 4.0 to 6.0 µg/L would be considered acceptable.

Since for almost all substances it appears that the variability of results increases in concentration, an allowance is made for the increased variability for those samples whose target values are above the lower limit for use of basic acceptable error. The allowance is added to the basic acceptable error, and it is calculated by multiplying the concentration error increment by the difference between he target value and the lower limit for use of basic acceptable error.

For example: If a target value for a sample is 21 µg/L, and the lower limit for use of basic acceptable error is 10 µg/L, the difference between them is 21 - 10 = 11 µg/L. Multiplying the difference by the concentration increment, 11 µg/L x 0.10, gives 1.1 µg/L to determine the acceptable difference 21.0 ± 2.1 or 18.9 to 23.1 µg/L would be considered acceptable and would not be flagged.

In general, the values chosen for the basic acceptable error and the concentration error increment are selected so that several of the participating laboratories will have demonstrated the ability to do the analyses satisfactorily. In a sense the values represent state of the art for analysis of the round robin samples.

Flag: A result is flagged high H when its value is greater than the median (target) value plus the acceptable difference but not greater than the median plus 1.5 times; a result greater than 1.5 times the acceptable difference is flagged with VH. Similarly, a result less than the median minus 1.5 times the acceptable difference is flagged L a lower result is flagged VL.

Acceptable Difference or Acceptable Deviation:

The absolute values of the maximum difference between a result and the target value which will not be flagged.